AUG 19 1929

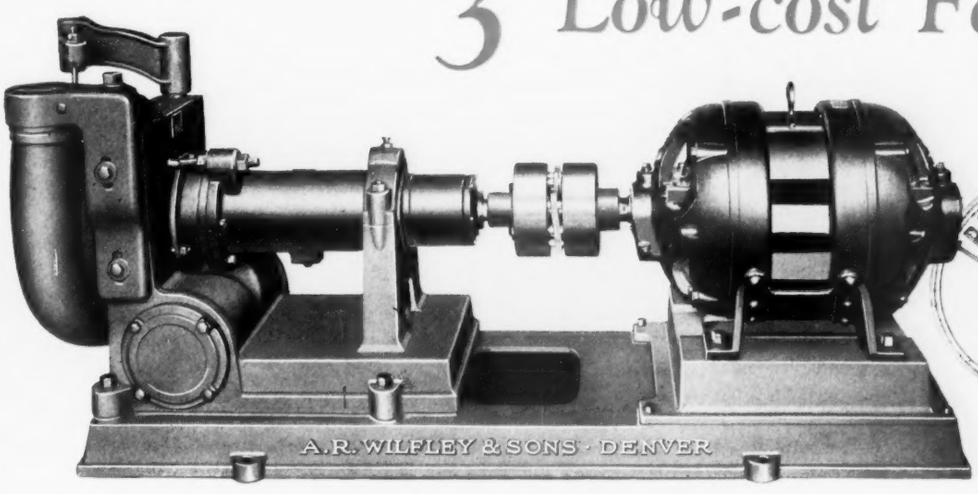

# Rock Products

With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Chicago, August 17, 1929 (Issued Every Other Week) Volume XXXII, No. 17



## 3 Low-cost Features for Pumping Cement Slurry

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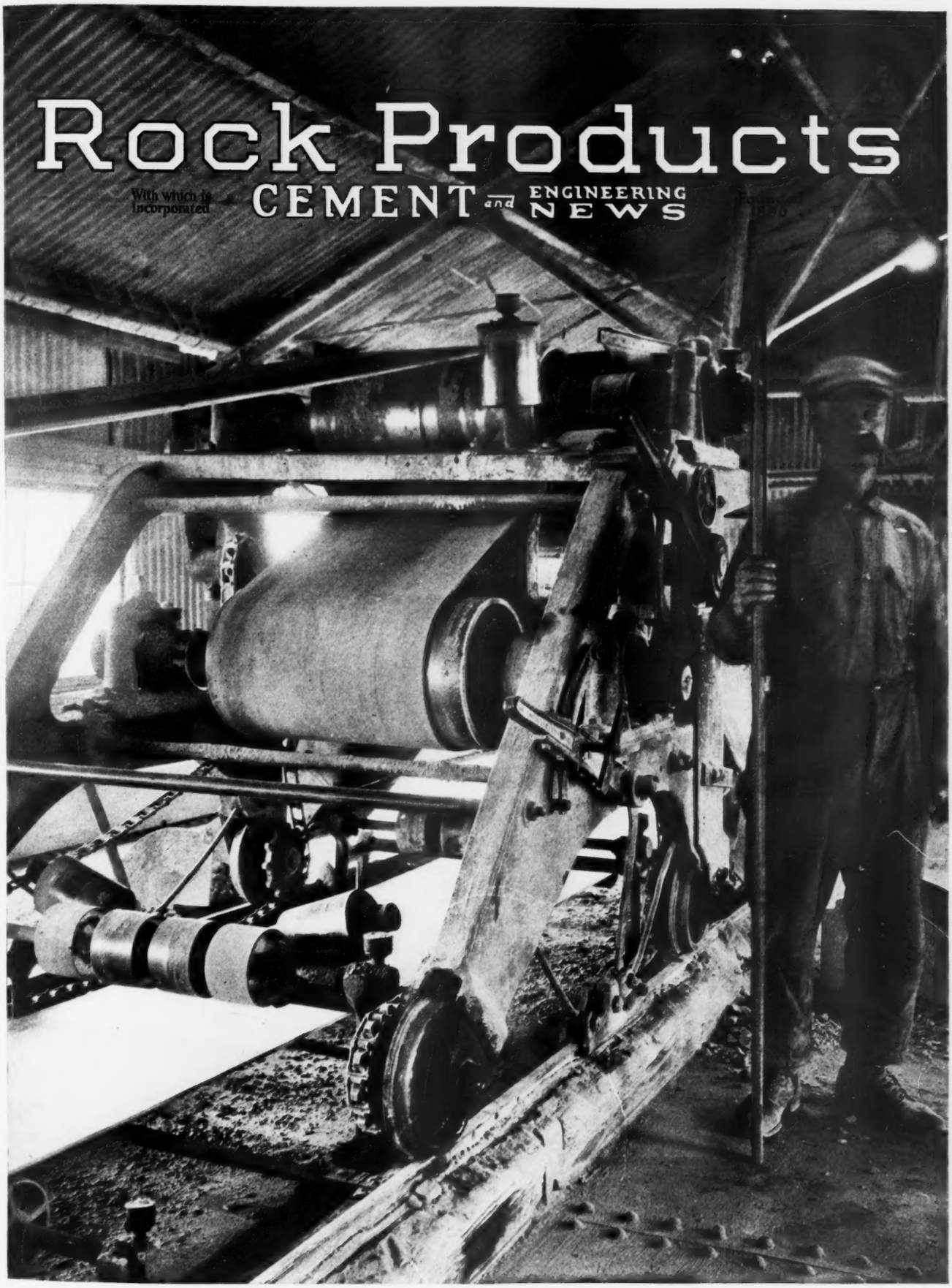


*The automatic tripper on the limestone carrying belt by which the stone is discharged to steel bins, Canada Cement Co.'s Manitoba plant*

# Manitoba Plant of the

PLANT NO. 13 OF THE CANADA CEMENT CO., Ltd., was built in 1911 but did not start active production until 1913. The Canada Cement Co. built the original plant using the dry process and operated on that basis until December, 1927. Climatic conditions are such that the active season is from March to December, and production is practically at a standstill during the winter months. Consequently at that time operations were stopped completely for five months and the work of making plant changes and installing the new equipment necessary to operate by the wet process was rushed so that by the following season production of wet process cement was started.

At first only two kilns were installed, but it was later deemed advisable to provide a third kiln so as to give better balance to the operation; the raw and finished cement grinding equipment could readily handle the third unit's output. It was only necessary to install a second clay mill to meet this increased capacity. During the winter months of 1928-29 the third kiln was installed, bringing the plant capacity up to 5100 bbl. of cement per day. The plant now employs 150 men during the operating season.

***Safety trophy awarded the plant for a perfect no-accident record in 1926***

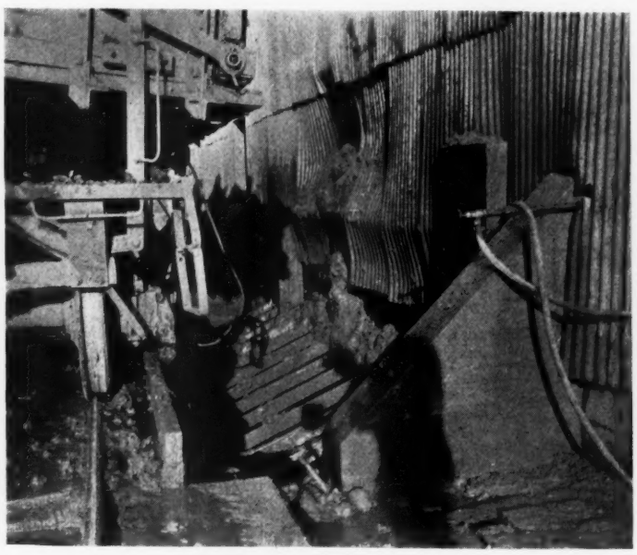
The plant and clay pits of this company's interesting operation are located four miles south of Portage Ave., Winnipeg, Manitoba, Can., on the lines of the Canadian Pacific and Canadian National railroads. The situation is not within the city limits of Winnipeg but adjacent to the town of Fort Whyte. Limestone for the plant is secured from the company's quarries at Steep Rock, 125 miles north of Winnipeg on the Canadian National railroad branch. About 25 miles further north along this same railroad are to be found the gypsum quarries supplying rock for the Winnipeg plant of the Canada Gypsum and Alabastine Co., Ltd.

In an operation where thousands of tons of freezable solution are to be handled daily, in a northern climate where winter temperatures as low as 50 deg. (F.) below zero are nothing unusual, it was interesting to know why the company changed from a dry to the wet process. A. G. Fleming, chief chemist of the Canada Cement Co., sets forth the principal reasons as follows:

"The change in our Manitoba cement plant from dry to wet process was made primarily because of the difficulties we had experienced in the handling and proper preparation of the clay supply available for the process.

"The clay known as 'gumbo' is a very sticky, plastic material which is extremely difficult to dry and even more difficult to prepare for efficient drying, particularly in lumps and blocks of the size usually resulting from excavation with steam shovels, dragline scrapers or other similar machines. After a considerable amount of discouraging experience, which included a trial of various types of steam driven excavators and the installation of two large preliminary rotary driers, the company resorted to the use of plows and scrapers which took thinner cuts and permitted a partial drying of the pit surface by the air and sun.

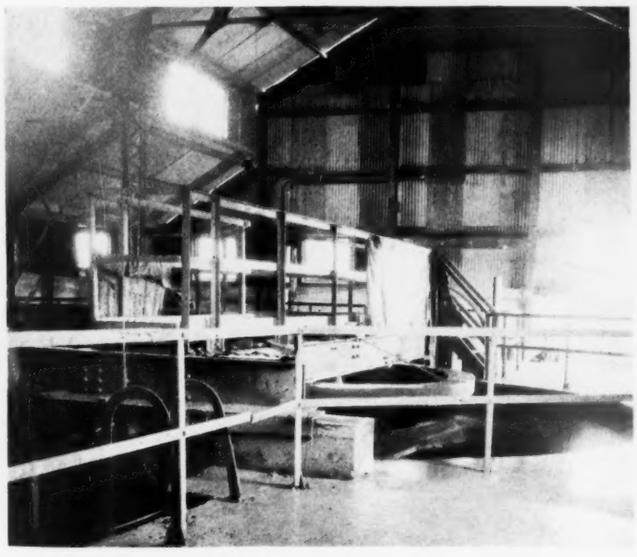
"This method of working the pit made the clay less difficult to handle and gave better results in so far as obtaining a thoroughly dry material necessary for successful dry process operations; but it required a large expenditure for labor and fuel and wet weather still created a handicap for steady and successful operations. There was considerable variation in the composition of the various layers of the deposit and it was difficult to work the pit to get a uniform composition. The greater part of the clay deposit, as stated before, is a sticky, plastic gumbo; the top four feet being mixed with organic matter is black in color but of a fairly good



***The "gumbo" is passed over a grizzly before it goes to the clay mill***

# Canada Cement Company

silica-alumina ratio. At intervals between succeeding layers of the grey and yellow gumbo are pockets of fine light clay silts higher in silica than the gumbo. When, by plow and scraper method of working the pit, one of these pockets was encountered, this material gave trouble through its tendency to separate and blow away from the heavier clay in the driers, and even in the kilns, the draft was usually sufficient to separate it in part from the raw mix entering the kiln before it had reached the hot zones of the kiln. The clay deposit, when worked on a 30- or 40-ft. cut, has a rather low silica-alumina-iron ratio and the more siliceous silt should have been beneficial, but advantage could not be taken of it in the dry process. However, on the other hand, on account of the fact that in the wet process practically all, as compared to half or less in the dry process, of the coal ash is combined in the clinker, we found that our silica ratio was lower in the clinker than it was in the dry process, because coal ash is relatively low in silica and is high in alumina and iron. On this account we have had to add a small proportion of very fine sand to correct our mix to the required composition. This has helped greatly in the prevention of rings in the kilns.



***Clay mill discharges through 1/8-in. screen to sump at left***

"For the reasons outlined we decided that the wet process was the more logical one for adaptation to our materials, since successful dry process operations require a most thorough drying of the stone and clay in order to get the intimate mix and uniform composition. At other Canada Cement Co. plants the drying of the rock and clay and its proper preparation for the kiln has been found less difficult, but from the starting of operations at the Manitoba plant it has been a discouraging and expensive operation in wet seasons.

"Chemical control under the old arrangement was difficult to obtain. The mix was frequently irregular in composition despite the efforts of the chemists to keep it uniform, and could not be corrected to the required composition after it had passed the tube mills. With the facilities at hand in the wet process the chemists have absolute control and keep the lime content of the slurry from varying even as little as one-tenth of one per cent. As an example, the lime content of the slurry in the kiln tank was carried for some time at 32.71% without fluctuation. This was considered too difficult to burn efficiently, and a decrease of half a per cent was decided upon. More clay was added to the mix and in due time the contents of the slurry tank were brought exactly to the 42.21% lime required. For some weeks the composition of the slurry was held at this point until an increase in the silica content of the material made it possible and advisable to raise the lime slightly. It was raised to 42.28% and held there for over thirty days without any difficulty.

"The chemist in his control routine obtains samples every two hours from the tube mill sump into which the slurry from all the raw material tube mills is discharged, moisture and lime determinations are soon made and if the composition is not correct, the clay feeders are checked and regulated and another sample taken half an hour later.

"The slurry is pumped to the correcting tanks, four in number, and these are sampled about a half-hour after being filled, in order to give the mechanical agitator with which each one is equipped a chance to do its work properly. Samples are drawn from the bottom and middle and near the surface of the tank and mixed together for a composite sample of the tank's contents, and a grab sample is taken from the tank for a check. If these samples do not check on lime and water determinations, another sample is drawn from the tank which has been meanwhile more thoroughly mixed.

***Dragline excavating clay. The mark left by the teeth of the bucket indicate the sticky nature of the material***

"If the contents of the tank are found to be of the correct composition, it is now discharged into the mixing tank, but if it is lower or higher in lime content than required, it is blended in exactly the right proportions with part or all of the contents of another tank containing slurry higher or lower in lime contents, as the case may require.

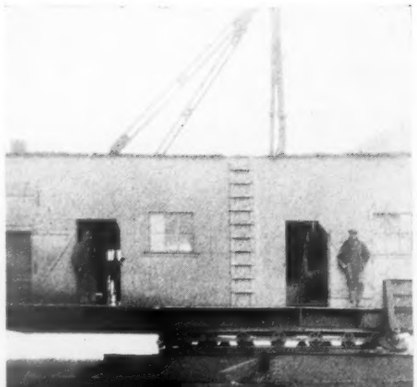
"The contents of the correcting tanks are run by gravity into the mix tank, the capacity of which is over three times that of a correcting tank. The mix tank is equipped with mechanical agitators and discharges by overflow into the large kiln storage tank which holds the contents of nearly thirty correcting tanks. This is kept continuously agitated by the F. L.

Smidth traveling mixers. Thus, although great pains are taken to insure that only slurry of the correct composition enters this tank, an error of nearly 3% in the lime content of one full correcting tank discharged into the large kiln tank would effect a change of only about 1/10% in the lime content of the large tank when the latter is full.

"The process is more flexible than the old one, and, while it requires rather more chemical work than formerly, it amply repays the chemist for his efforts by the perfect control he obtains.

"The slurry is ground to a fineness of about 90% passing a No. 200 sieve; the cement is about 84% through the No. 200. The water content of the slurry is rather high, due to the collodial nature of the clay. At present the water content is about 42%. Some trouble was encountered at first from the formation of rings about 40 ft. from the front of the kilns but this has been practically overcome by increasing the silica content of the mix aided by increased proficiency of the burners and the use of better coal.

"The product of the old plant was of very good quality in so far as measured by strength, setting properties, fineness and properties covered by specifications. At times we had difficulty getting the fresh cement to pass the boil test without holding it in the warehouse to season. This is no longer necessary. The color of the new product is a beautiful grey which never varies, since the Unax coolers cool it efficiently without the use of water for quenching, the latter being the main cause of color variation in cement.



***The dragline excavator at the clay pit rides on timber mats***

"The improvements noted in the quality of the product may be summarized as follows: (1) Improved uniformity in chemical composition; (2) Uniform soundness in steam or other accelerated tests; (3) Improved setting properties—setting time is very uniform; (4) Slight improvement in tensile and compression strength, and (5) More uniform color."

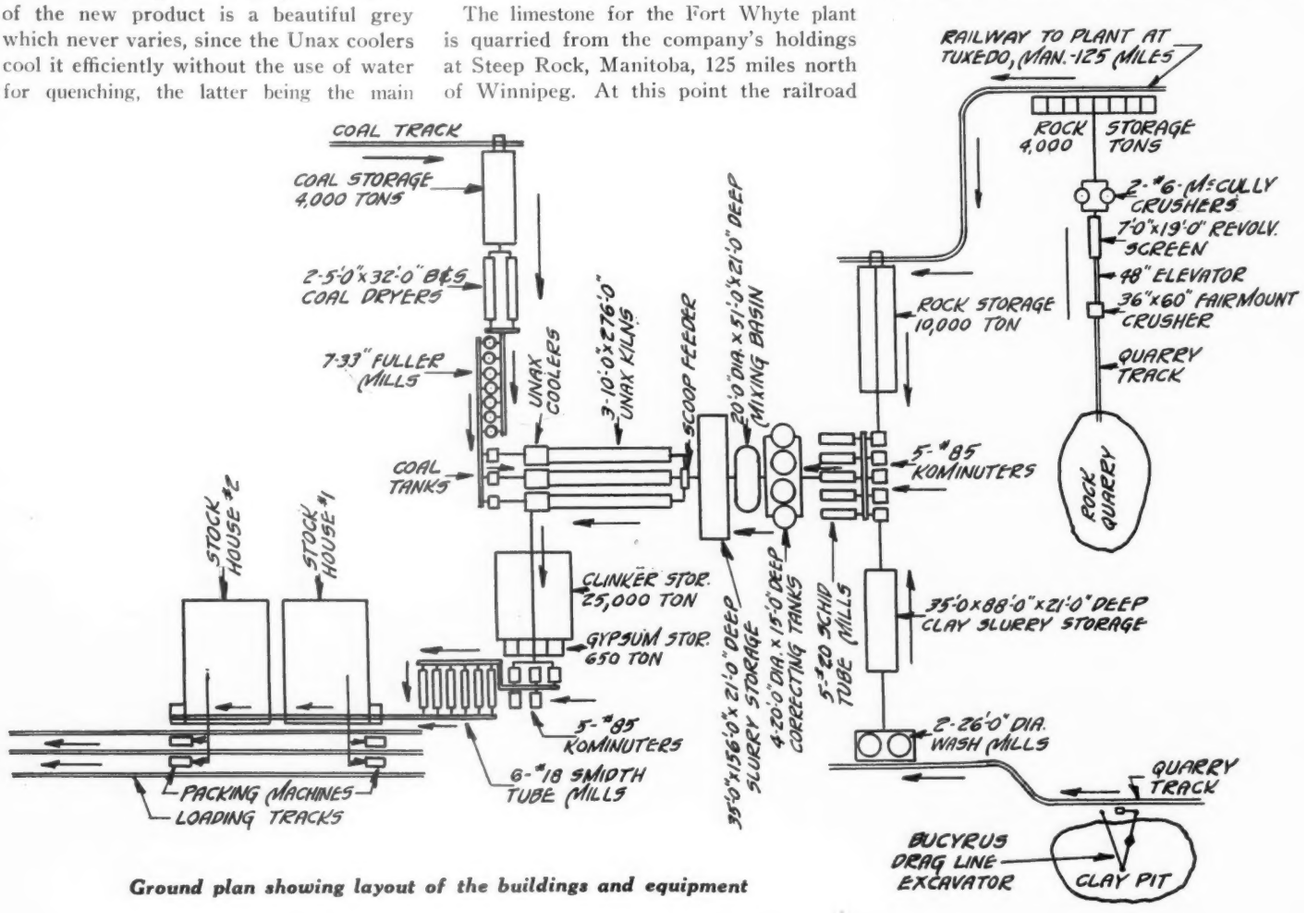
### *Limestone Quarries*

The limestone for the Fort Whyte plant is quarried from the company's holdings at Steep Rock, Manitoba, 125 miles north of Winnipeg. At this point the railroad branches, one leg extending northward and the other heading due west to the edge of Portage Bay, an arm of Lake Manitoba. The deposit owned by the company comprises 1½ sections of low lying, limestone bearing property extending along the lake front.

The floor of the quarry is about level with the lake with a dip at the east end which drains into a lagoon. The quarry face is 18 ft. in height, extending about 1700 ft. and along the lake front back 1500 ft. from the water's edge. The floor of the quarry is in limestone and is the top of a deposit of considerable but unknown depth. Very little overburden is present.

The stone is thin bedded, strikingly mottled and almost flat-lying, though a dip of 3 to 6 deg. to the west seems to prevail at the west end of the quarry. Vertical joints are common and there are occasional areas where the beds seem to have been shattered and domed up. Pockets of clay are common in holes in the rock.

Two Loomis "Clipper" well drills, driven by individual 10-hp. Fairbanks-Morse gas engines, are used for primary drilling. The rock after shooting is loaded by a Marion No. 61 with a 2½-yd. bucket to 6-yd. Kilbourn and Jacobs side-dump cars which are drawn in trains of 5 or 6 cars, to the foot of the incline by a 15-ton Dickenson steam locomotive. At the




***Ground plan showing layout of the buildings and equipment***

crusher incline the cars are hoisted singly by a 75-hp. motor and dumped to a 36-in. by 60-in., "Fairmount" type, Allis-Chalmers, single-roll crusher driven by a 150-hp. motor. The crushed rock drops into a 48-in. bucket conveyor which discharges to a revolving screen. The fines (minus 3-in.) fall to a chute leading to the storage conveyor belt, and the oversize passes to a storage bin from which this material is fed to two No. 6 McCully gyratory crushers both of which discharge to the above mentioned 30-in. belt conveyor that serves the rock storage. The bucket conveyor and screens are driven by a 75-hp. motor and the No. 6 crushers by individual 75-hp. motors. The two No. 6 McCully crushers are being replaced by one Pennsylvania SXT12 swing hammer mill, which is to be driven by a 250 hp. synchronous motor through a magnetic clutch.

The conveyor belt from the crushers delivers the rock to a level-running, 30-in. belt conveyor running over the top of the storage bins. Rock is discharged from this belt by a self-propelling, hand reversing tripper to the various bins. A 25-hp. motor drives the inclined belt from the crusher and a 15-hp. motor, the horizontal belt serving the bins.

The reinforced-concrete bins are divided into eight sections, each section holding 300 tons of crushed limestone which can be discharged to standard-gage, hopper-bottomed gondolas on either of two tracks that run on both sides of the bins. The crushing plant has a capacity of 1000 tons of stone per 9-hour day.

The old power house is located about 1500-ft. from the mill and here two 450-hp. Wilcox and Babcock water tube boilers equipped with Green economizers supply steam for the turbine driving the 500-k.v.a. Westinghouse generator. This generator and turbine were moved to this location from one of the older plants and are now 25 years old, doing good service. The installation was one of the first of its kind in Canada. The turbine operates at 3600 r.p.m. The exciter set consists of a 30-k.w. Siemens Bros. dynamo directly connected to a Bellis and Marcom vertical compound steam engine.

The above power plant is a standby, a 360 hp. Fairbanks-Morse Diesel engine direct connected to a 300 k.w. generator installed in 1927, supplying all the power needed for quarry plant operation and lighting.

The company employs 33 men at the limestone quarry, under the direction of Louis de Tilluel, superintendent. A shop is maintained for necessary quarry and plant repairs and there is also a well stocked commissary.

Crushed limestone is delivered to the Winnipeg plant in gondola cars holding 50 tons each, which are dumped to a steel track-hopper located at the end of the stone storage building. This track hopper discharges to a 24-in. by 24-in. McCaslin conveyor. The hopper is provided with a grizzly made from short lengths of old rails spaced at 3-in. centers, an adaption which not only prevents large chunks of stone from getting into the system but also acts as a safety-first device and prevents any of the workmen falling into the hopper.

The McCaslin conveyor is an endless bucket conveyor that passes under the entire length of the limestone storage bins and the track hopper as well. Rock

***Flow sheet of operations at the Manitoba plant***

can be drawn from storage or from the track hopper, or from both sources, elevated, returned to storage or delivered to a 30-in. cross conveyor belt, the purpose of which will be described later. This bucket conveyor has 371 buckets, 24-in. by 24-in. spaced at 2-ft. centers, and each bucket holds, roughly, one-half wheelbarrow load of crushed limestone, and the buckets can discharge at any of several predetermined points. This makes it possible to unload rock from the track hoppers and deliver a portion to storage, sending the balance to the mills. The rock can be discharged to 12 different openings in the top of the limestone bins. The McCaslin is driven by a 25/30-hp. Lancashire induction motor running at 680 r.p.m., belted to gear reductions at the head pulley to permit the conveyor to make the round trip in 30 minutes.

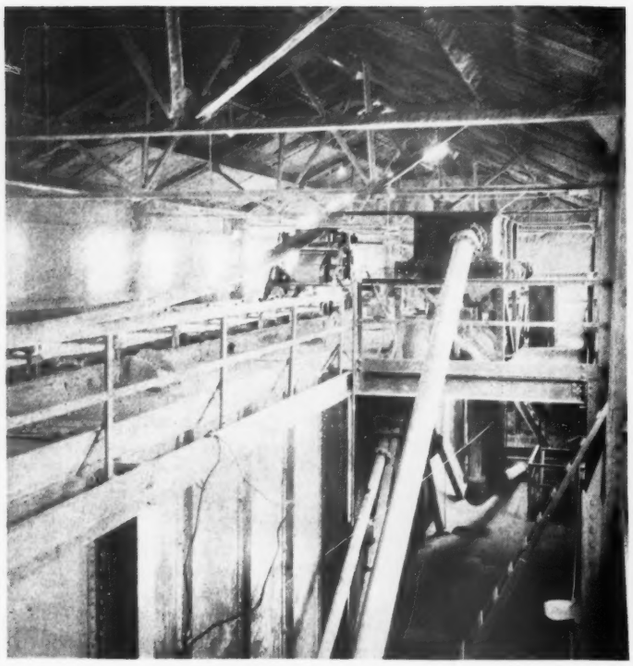
The limestone storage bins are built of steel and reinforced concrete, and hold a total of 12,000 tons, an amount sufficient for about two weeks operation under normal operations. All stone delivered to these bins is minus 2½ in. The stone from the new hammer mill will be minus 1 in.

### *Clay*

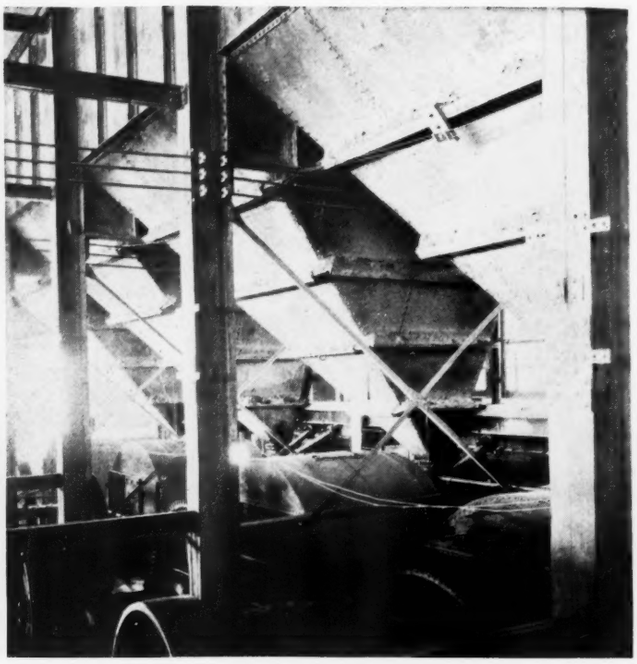
The clay for the Canada Cement Co.'s plant is taken from pits on the property of the company about one-half mile behind the plant. It is dug from an open cut, 25 to 40 ft. deep, by a Bucyrus Class 20 dragline excavator equipped with an 85-ft. fabricated steel boom and a 3¾-yd. bucket. At present the depth of the pits are kept close to 25 ft., as it was found that the deeper areas showed too much iron content, and this was responsible for "ringing" in the burning process. The areas adjacent to the clay deposits are more or less swampy and the drag excavator is therefore mounted on 8-in. by 10-in. timber and sills so constructed to act as a mat on which the excavator rides. The drag is moved backwards over this mat by means of short lengths of 6-in. pipe placed as rollers under the large timbers that form the bed of the excavator. Water is supplied the shovel by a Domestic pump, a product of the Domestic Engine and Pump Co., of Shippensburg, Penn.

The clay is a black, sticky "gumbo" and when wet, which it always is at this operation, is rubberlike and very difficult to handle. The teeth marks in the bank below the excavator are plainly visible in the illustration and will give some idea as to the nature of this material. The amount of gravel or other hard substances in the clay is so small that the clay wash mills need only to be cleaned out about once per month.

The dragline loads to 12-yd. Western side-dump, air-operated cars which are hauled over a standard-gage track, in trains of two cars each, by a 7-ton Ply-



*Tripper (upper left) discharging limestone to bins over the raw grinding mills. The clay feeder for the mills shows on the platform at the right*



*Feeding bins of steel are placed directly over the raw grinding units. Limestone passes from these bins to a table feeder and thence to the mills*

mouth gasoline locomotive to the F. L. Smidth clay wash mill. Here, gumbo is dumped on to a grizzly of old rails spaced at about 15-in. centers, and the stiff clay is cut or spaded into pieces of sufficient size to drop into the clay mill for further pulpification. Water is also applied to the stiff mass, as it lies on the grizzly, by means of a hose, to further assist in the disintegration of the clay. Any extra carloads of clay are spotted above the mill and dropped down as needed by gravity, and when unloaded the empty cars coast to a point below the plant, where they are assembled and returned to the clay pits.

The wash mill rabble mechanism rests in a concrete basin 26 ft. in diameter and 10 ft. deep, lined on the sides and bottoms with granite blocks. A central concrete pier supports the revolving arms of the wash mill, and heavy steel harrows are hung from the ends of the arms by means of chains. As clay is added to the mill, water is also added, and the harrows reduce the colloidal clay to the proper consistency. The rabble arms rotate at 11 r.p.m. Owing to the colloidal properties of the Winnipeg clay and the presence of considerable vegetable matter, it is necessary to use a clay slurry containing about 75% water and 25% solids.

*Looking down into the wash mill*

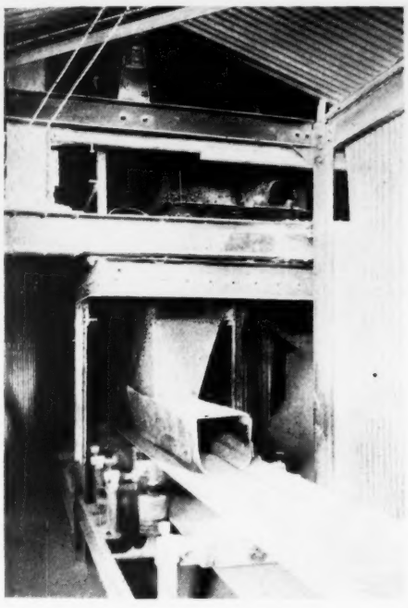
The wash mill is driven by a 15-in. belt from a 75-hp., 514-r.p.m., 550-v., General Electric motor. All the a.c. motors operate on 60-cycle, 3-phase current. The mill is housed in a steel frame, corrugated iron structure, apart from the main sections of the plant. All floors are concrete, and the walls of this building are of reinforced concrete from the floor line to a vertical height of about 5 ft.

Water is supplied the wash mill by a self-oiling Fairbanks-Morse "Typhoon" pump that operates at 216 r.p.m. and delivers 5000 gallons of water per hour through a 2½-in. line. The pump is directly connected by a silent chain drive to a 15-hp., 860 r.p.m. Type HS, constant speed Canadian Westinghouse motor. Water is taken from an old abandoned clay pit a few hundred feet from the plant, the pump being on the bank of this pit; the water is elevated on the suction side, a vertical distance of 8 to 9 ft. Additional water for the mill and domestic uses is pumped from deep wells by an air-lift pump discharging to a 36,000-gal. storage tank. Steam lines paralleling the water-supply lines are provided to prevent this water supply and the clay slurries from freezing during the winter months.

The discharge from the wash mill is continuous and the outgoing slip passes through two sets of racks or screens: the

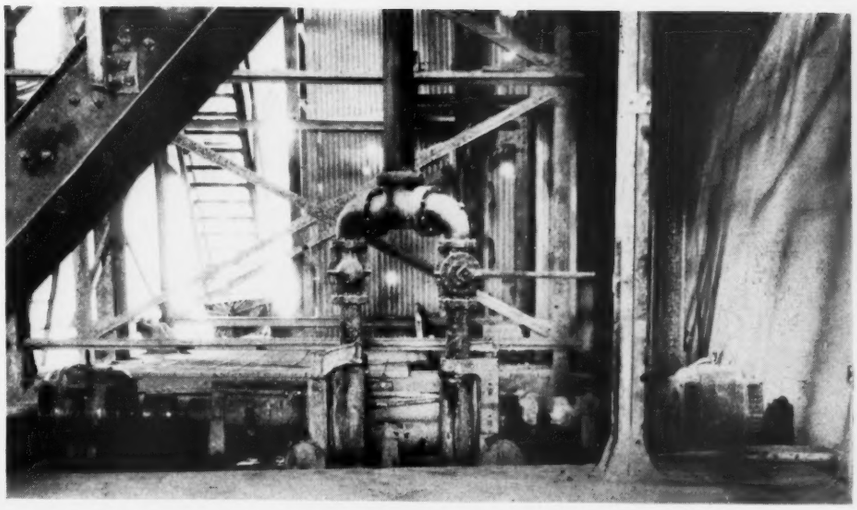
first, being coarse, collects the larger pieces of foreign matter, and the second screen, of cast-iron sections, catches any smaller particles not washed down in the mill. The wash mill discharge passes through this screen to a clay slurry sump immediately alongside of the circular pit in which the wash mill operates. From this sump the first laboratory control sample is taken and the water content determined, as well as a complete analysis made of the solids.

The clay discharges to a set of two 6-in. Wilfley slurry pumps placed in a pit alongside the slip, each direct-connected to a 40-b.hp., 900-r.p.m. Lancashire D. and M. Co. motor. Clay slurry, by means



***Cross conveyor delivering limestone to the belt conveyor feeding the raw grinding bins***

of these pumps, can be sent to the clay slip storage or bypassed back to the clay sump through a separate discharge line. The 6-in. discharge and the 8-in. suction lines of the two pumps are provided with Merco-Nordstrom lubricated valves, as



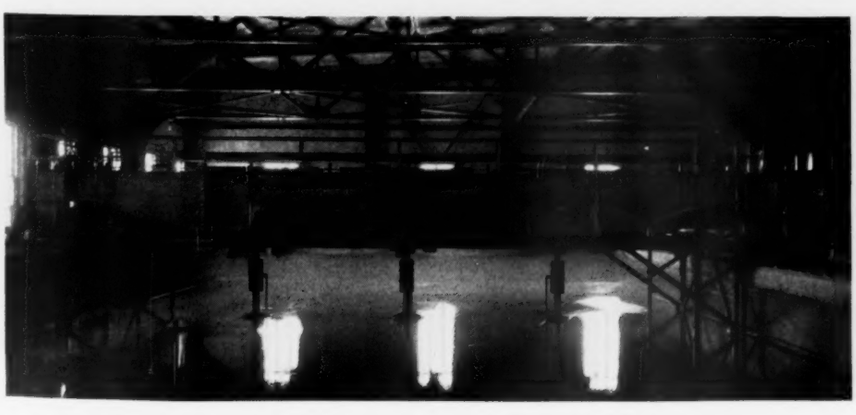
***Slurry from the clay storage basin is pumped to the clay feeders***

are all the pumps and pipe lines that handle sludges or slurries throughout the balance of the plant. One pump is sufficient to operate the plant, and the second one is used as a spare.

### *Clay Storage*

The clay slip storage is a rectangular tank, 88 ft. long, 35 ft. wide and 21 ft. deep, with volume of 61,600 cu. ft. Contents of the tank are kept in constant agitation by an F. L. Smidth triple traveling agitator provided with automatic reversing mechanism. The three vertical agitator shafts are provided with three horizontal agitator arms each and with one air jet to each shaft. Compressed air is injected into this tank through these jets at 50-lb. pressure. Air is also injected intermittently into the corners of the rectangular basin, which prevents any material from building up at those places.

The agitator bridge travels the full length of the agitator basin at 14 ft. per minute and is reversed by a trip switch and travels back to the other end where the same reversing operation takes place. Electric power is supplied to the bridge by means of a rubber-covered cable which winds up on a drum as the bridge nears the junction box. The agitator mechanism is driven by a 10-hp. General Electric motor, Type I, operating at 900 r.p.m., working through a Jones 20:1 speed reducer. The speed of the agitator arm is further reduced by bevel and pinion gear units at each agitator shaft. Traveling mechanism is driven by a 7½-hp., 600-r.p.m. Higgs motor and a Cleveland 500-HT, 49:1 gear reduction unit.



***The self-reversing traveling agitator serving the clay storage basin***

### *Clay Slurry Feeding*

The slip from the clay slurry storage basin is pumped to the F. L. Smidth quintuple clay feeders, located at the top of the limestone storage hoppers ahead of the "Kominuters" by two 6-in. Wilfley centrifugal pumps supplied by the W. Hamilton Manufacturing Co., Ltd., Petersborough, Ont. Both pumps are direct-connected to individual 60-hp., 870-r.p.m. Lancashire motors. The 8-in. suction and 6-in. discharge lines are provided with Nordstrom lubricated plug valves, and this pipe line layout is so designed that the lines can be drained when not in use.

The clay slurry is fed in predetermined and exact amounts to the five Kominuters by an F. L. Smidth 5-outlet clay feeder. This device regulates the amount fed each grinding unit by means of an outlet, the size of which can be varied and which under a constant head gives a constant flow of slurry. The rate of flow is checked by the operator at frequent intervals by noting the time required to fill a container of known capacity. This is accomplished by bypassing the flow temporarily to the volumetric device, after which the contents and flow are diverted back to the regular channels. The rate of flow can be controlled from the Kominuter floor by remote rope controls. In the event that a Kominuter is thrown out of service, the slurry from that mill is diverted to a manifold which returns the slip to the clay storage basin.

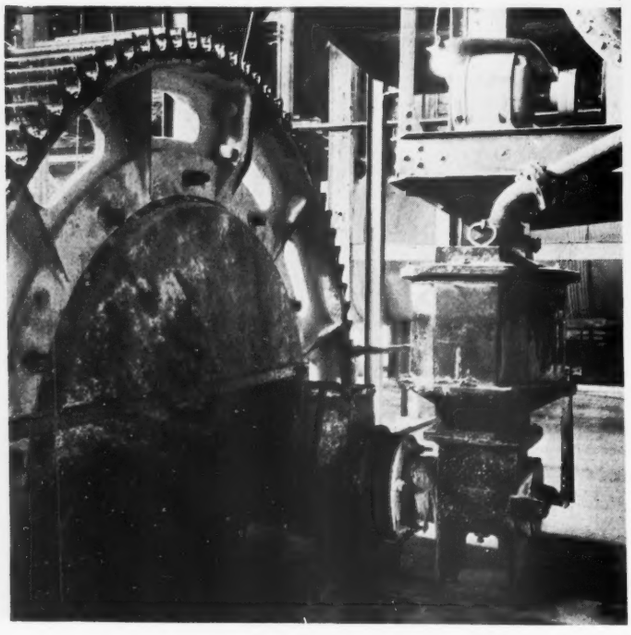
*The long bucket conveyor which carries limestone from the track hoppers to storage bins*

In the bottom of the clay feeder is a small screw conveyor that functions to prevent settling, and is also an additional means of transporting the heavy sludge. The screw is driven by a 3-hp., 1800-r.p.m. Canadian General Electric Co. motor connected to a Cleveland, 100-J, 50:1 gear reduction unit. The measured flow from this screw falls by gravity to the feed end of the first raw grinding units.

### *Limestone*

Returning to the McCaslin conveyor handling the crushed limestone this conveyor discharges to storage bins or to a 30-in. cross belt conveyor, elevated through an angle of about 20 deg., which delivers the 2½-in. stone to a second 30-in. Goodyear belt conveyor, that runs parallel to the McCaslin. This belt elevates the rock during the first part of the trip to the top of the Kominuter feed tanks, where the belt conveyor assumes a horizontal position as it passes over a power-propelled, hand set, Stephens-Adamson tripper that discharges the stone to any point in the bins over the crushing units. The Kominuter feed bins are of steel and hold a total of 300 tons of rock.

The 30-in. cross conveyor belt is driven at the head pulley by a 15-hp., 900-r.p.m., Lancashire motor, through a size 300-AT, 21½:1, Cleveland worm gear reduction unit. The second 30-in. conveyor is driven by a 13-hp., 900-r.p.m. Lancashire motor, through an open gear reduction.



*Volumetric slurry regulator feed to the wet grinding mills*

The rock from the steel bins is fed by a horizontal, revolving table feeder to five No. 85, F. L. Smidth "Kominuters" in which are about 10,000 lb. of steel balls. Rock is fed to the center of the revolving table by a vertical pipe of large diameter and the stone, as it spreads itself over the surface of the table, is plowed off by a vane. The amount of rock fed is governed by the length and direction of the adjustable plow. Each feeder is driven by gears from each grinding unit.

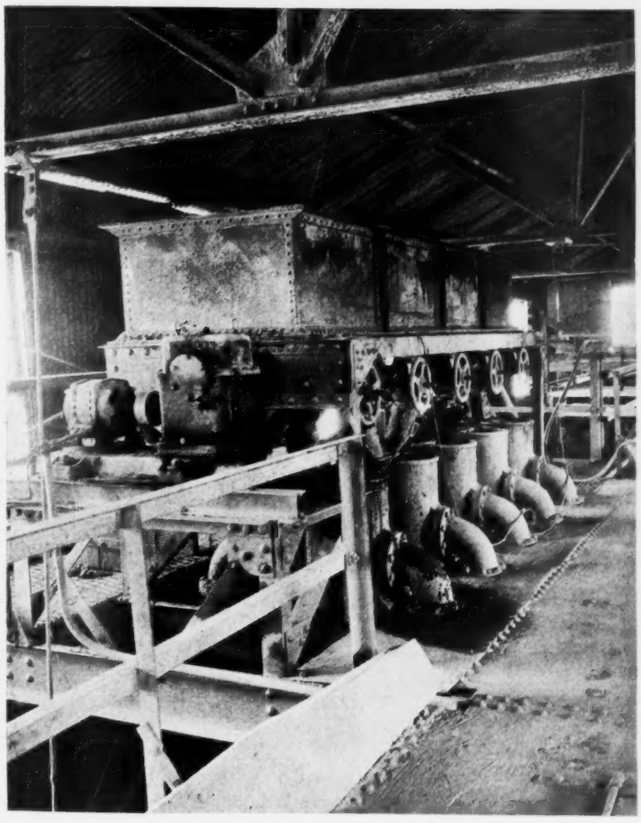
### *Wet Grinding*

The clay slip joins the limestone at the intake of the Kominuters, where additional water can also be fed to the mills so the final discharge product will have a 42% water content. Each Kominuter is driven by an 18-in. belt connected to a 100-hp., 600-r.p.m., type 1, Class 12, Canadian General Electric motor. The Kominuters were originally dry mills, but were converted for wet grinding, and have a capacity of 40 bbl. of minus 20-mesh material per hour. They are set in a row parallel to each other and parallel to and in the same building with the kilns, and are numbered from 1 to 5. The mills discharge below to a floor that drains to two elevators at each end of the row of mills. This floor is similar in construction to a gable roof, the apex of the drain being under No. 3 mill and sloping both ways from that point to the two single-chain bucket elevators that discharge to two F. L. Smidth "Trix" mills located at the head of each bucket elevator. Owing to the abrasive nature of the product being handled by these elevators, they are

*Parabolic bins discharging slurry to the measuring devices which feed the mills*

equipped with "Promel" elevator chains, a special malleable chain fitted with manganese steel bushings and nickel steel pins.

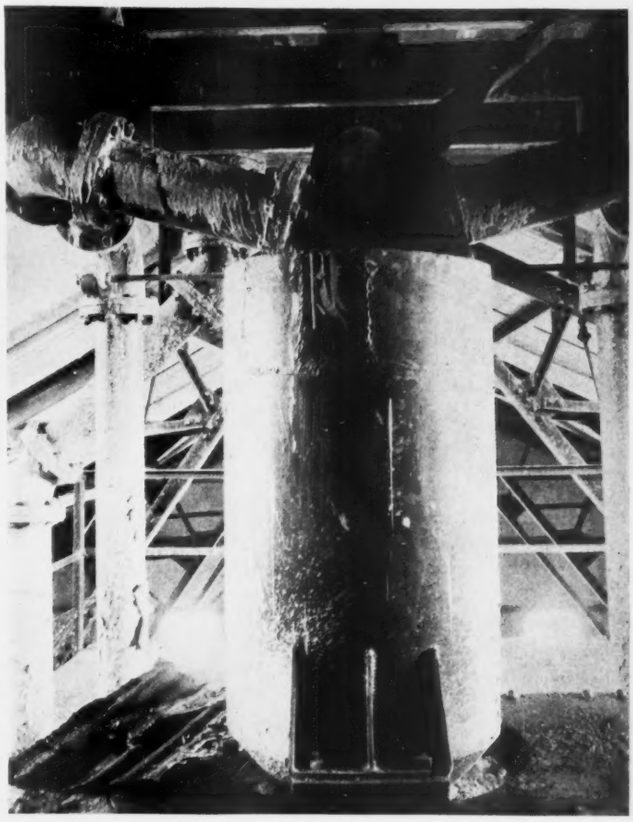
The Trix mills act as wet screening devices to separate the coarser discharge products by a combination of centrifugal force and screens, returning the oversize to the Kominuters by a concrete launder. The fineness of the Kominuter discharge is held at 95% to 96% through a 14-mesh screen and has a water content of 42%. The fines from the Trix mills are passed by a 6-in. pipe to a long parabolic steel tank that serves as a feed supply for the tube mills. Each Trix mill is driven by a 25/30-hp., 720-r.p.m. Lancashire motor, through a right-angled, size 400-A, Cleveland gear reduction unit, 4-5/6:1 reduction ratio. The elevators serving these screens are each driven by a cross belt from the same motors that drive the Trix mills.



***Clay slip from the storage basin is pumped to this quintuple feeding device; the amount fed each mill is regulated at the outlets***

The parabolic tank has a depth of 3½ ft., with a capacity of about 1000 cu. ft. of slurry, and has five outlets controlled by a slide gate (operated by a hand-chain wheel and screw), discharging to a measuring or flow regulating device to each tube mill that is set below and at right-angles to this tank. Fines from the Trix mill passing to this long, narrow, single-compartment storage tank are kept agitated by a mechanical agitator consisting of a long shaft extending through the entire length of the tank and from which at frequent intervals are attached rabble cross arms. The stirring mechanism is driven by a 10-hp., 600-r.p.m. Higgs electric motor, through a size 600-AT, Cleveland 60:1 worm gear reduction unit.

From the slide gates in the bottom of the parabolic tank the slurry passes through 4-in. pipes to measuring pockets where, by the use of a stop watch, the rate per minute flow can be determined, this rate of flow being related back to the fineness of the tube mill discharge and is the basis of feed control. The laboratory, under the direction of C. J. Murphy, plant chemist, makes frequent screen analysis of the discharge product, holding the fineness at 90% a 200-mesh screen. Each mill produces about 65 bbl. of slurry per hour of that fineness.

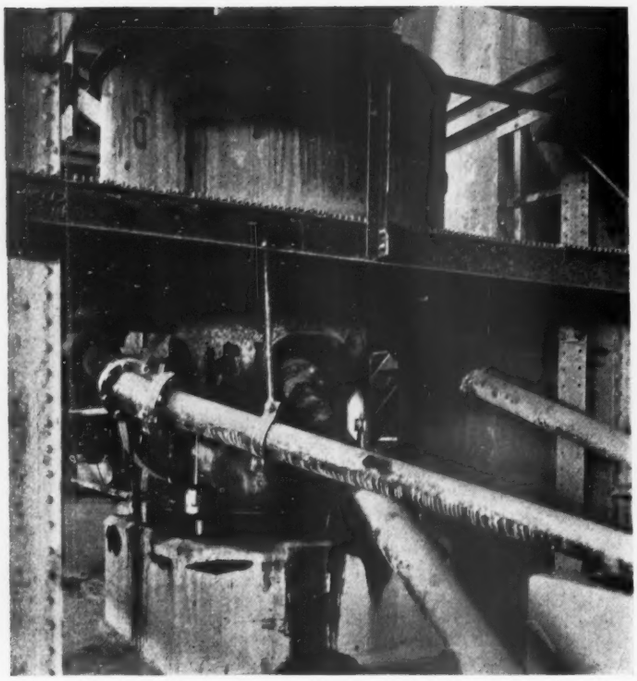


***Measuring pocket by which flow of slurry to the kilns is controlled***

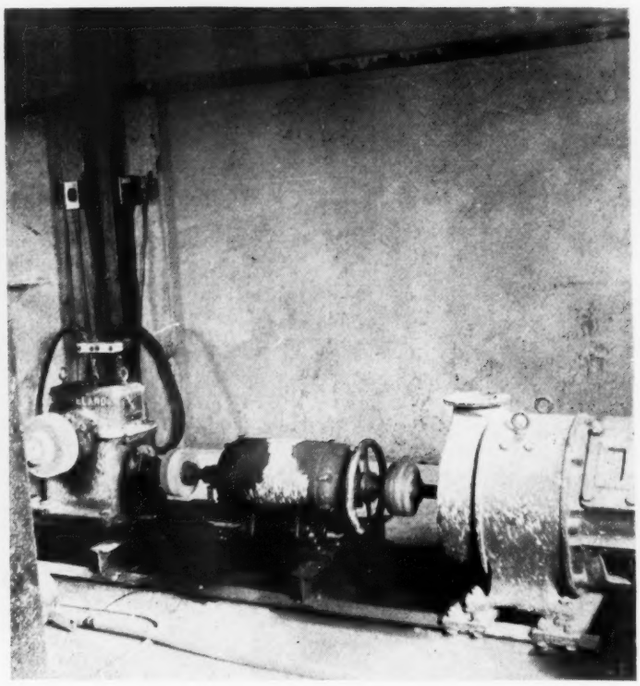
There are five F. L. Smidth tube mills, 7 ft. by 22 ft., each loaded with 42,000 lb. of special steel balls; 1¼-in. balls are used in the feed end and ⅝-in. "Cylpebs" in the "Cylpeb" compartment. The tube mills are located in the same building and are alongside of and parallel to the kilns and to each other. These grinding units all discharge to an enclosed screw conveyor that runs at right angles to the long axis of the mills and delivers the thick slurry to a small sump located between the tube mills and the kilns. This screw conveyor is driven by a 5-hp., 1200 r.p.m., Higgs motor, through a right-angle Cleveland worm gear reduction unit that reduces the revolutions of the screw to 60 per minute.

The tube mills are each driven by a 300-hp. Canadian General Electric motor, three-bearing, Type I, Class 14, 514 r.p.m., by means of a 24-in. belt. One of the drive motors rests on the same floor level as the kilns, and the remaining four motors are situated on a floor above and are about on the same elevation as the higher part of the tube mills. The mills are connected to these motors by a downward sloping belt. All of the motors are in a separate room from the tube mills and connect to the mills by an extended horizontal shaft.

The slurry in the small sump is sampled and a complete analysis made at frequent intervals, and this analysis governs the amount of clay fed to the Kominuters. This sample is the first one taken to control the ultimate quality as a whole; the samples previous to this were taken to obtain data on the content of the individual materials from which the cement is made, necessary information for intelligent correction to be made at this, the first point of chemical control.



*Wet screening device separating the coarser discharge products of the wet grinding mills*



*Each kiln and slurry feeder is driven by a combination of variable speed motor, speed reducer and variable transmission*

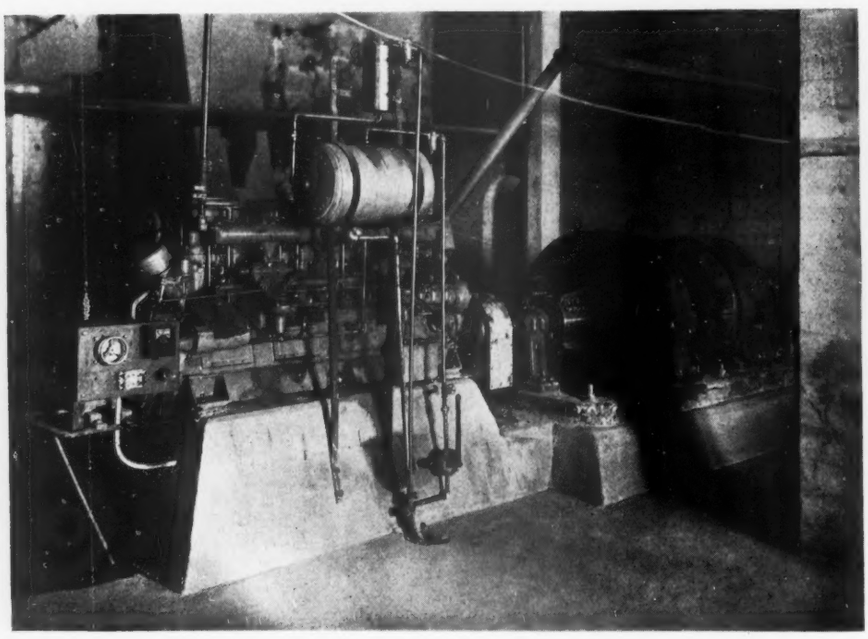
From the sump the slurry is pumped by two 6-in. Wilfley centrifugal pumps, each direct connected to individual 60-hp., 900-r.p.m. Lancashire motors, through an 8-in. line over the top of the kilns to a separate building alongside the power house, to the four correction tanks that placed at considerable elevation above the kiln floor. Each of the F. L. Smidth correction tanks is 15 ft. high by 20 ft. in diameter and has a capacity of 4400 cu. ft., thus the four tanks comprising the correction basin have 17,600 cu. ft. total capacity.

The slurry in the correction tanks is mixed and prevented from settling by air nozzles attached to the bottom arm of each of the quadruple mechanical agitators. The vertical shafts supporting the horizontal rabble arms are all driven from the same drive shaft (as the tanks set in a straight line), and a bevel gear and pinion is used for final r.p.m. reduction at each stirring shaft. This long shaft is driven by a 20-hp., 900 r.p.m. Canadian General Electric motor, through a Type 8-D Kennedy-Falk 18.1:1 speed reducer.

After the material in the correction tank has been sampled, analyzed and chemical content adjusted, the slurry is allowed to flow by gravity to a single large blending tank where the contents of the four correction tanks are blended and thoroughly mixed; or after two of the correcting tanks have been filled with slurry the chemist takes an average sample from each tank and determines the proportions in which the two tanks should be mixed to give a slurry having the proper proportions of lime, silica and alumina. The blending tank is 56 ft. 6 in. long, 20 ft. wide and 21 ft. deep, and built with rounded ends. It is provided with four sets of mechanical stirring arms and air for additional mixing. This basin, as well as the four correction tanks, has an enclosed top and the floor thus formed is used as an open passageway.

The mechanical agitating apparatus for the blending tank is similar in design as that used on the correction tank, except that the drive is a 20-hp., 900-r.p.m. Lancashire motor and a type 8-D Kennedy-Falk speed reducer.

The blending tank, after the sampling and chemical composition is checked, is syphoned into a rectangular storage basin, 156 ft. long by 35 ft. wide and 21 ft. deep, with a capacity of 109,000 cu. ft. of slurry, by means of a 20-in. by 20-in. syphon located at one end of the mixing basin. Since the storage basin and mixing tank are alongside each other, one division wall acts for both tanks. This sy-

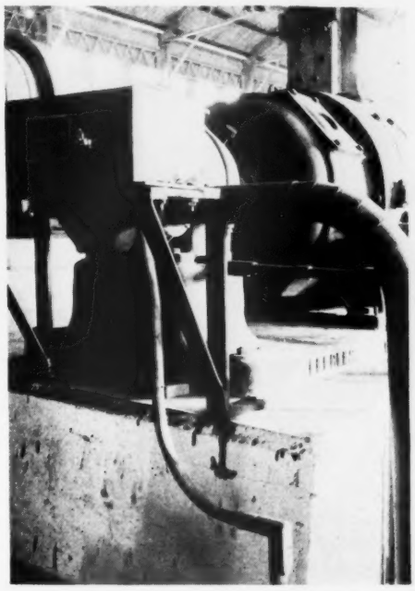


*The 8-cylinder gas engine which serves as an auxiliary d.c. generating unit*

phon always leaves 17 ft. of slurry in the mixing basin and is so constructed that the slurry has to pass down through the agitated portion of the tank before it can reach the storage basin. This insures a uniform mixture, which would not be the case if the materials flowed in and out by natural overflow means.

The size of the storage basin is such as to practically prevent any sudden fluctuations in the analysis of the material going to the kiln. Small variations in the raw end, by the time they are corrected, will not vary over 0.1% of the calculated percentages in the average content. Agitation of the storage basin is accomplished by a 3-unit, self-reversing F. L. Smidth traveling agitator of the same type used on the clay slip storage basin. Here the agitators are driven by a 10-hp., 900-r.p.m. Lancashire motor, through a W. A. Jones Foundry and Machine Co. 20:1 spur gear reducer. The traveling mechanism is driven by a 5-hp., 600 r.p.m. Higgs motor, through a size 500-RT Cleveland 49:1 worm gear reduction unit. Compressed air is supplied to the rabble arms and to advantageous places throughout the storage basin. The correction tanks, mixing tanks and slurry basins are all provided with steam pipes to prevent freezing during the winter operating.

From the storage basin the slurry is pumped to a point well above and directly over the kiln to the three (one for each kiln) F. L. Smidth kiln feeders, by two 4-in. Wilfley centrifugal pumps, each direct connected to 40-hp., 1200 r.p.m. Lancashire motors. These two pumps are in a wing adjoining the power and compressor house and on the same floor level. The kiln feed device consists of a rectangular box so fed with slurry that an excess is always overflowing back to the slurry storage basin. The idea is to keep a constant level of slurry in this box into which dips a rotating bucket pulley; the buckets dip into the constant slurry level, are filled and discharged through a 6-in. pipe line, the flow of which can be bypassed to another flow measuring device similar in principle to that described in connection with the tube mill feed regulator. From this box the slurry flows to the kilns through 6-in. pipes. The buckets are filled at the rate of from 6 to 8 per minute, the number of fillings being regulated by the chemist. The motor drive is peculiar, a 1½-hp. synchronous motor which exactly synchronizes with the speed of the kiln, being driven by a small a. c. generator coupled to the kiln motor. This small motor is direct connected to a Stephens-Adamson, type R, 120/720 r.p.m. variable speed transmission, that in turn serves a size 100-AT right-angle Cleveland 70:1 worm reducer. When these motors are speeded up or slowed down the feed motor does the same so that the feed to the kiln at all times is the same so far as the load in the kiln is concerned.

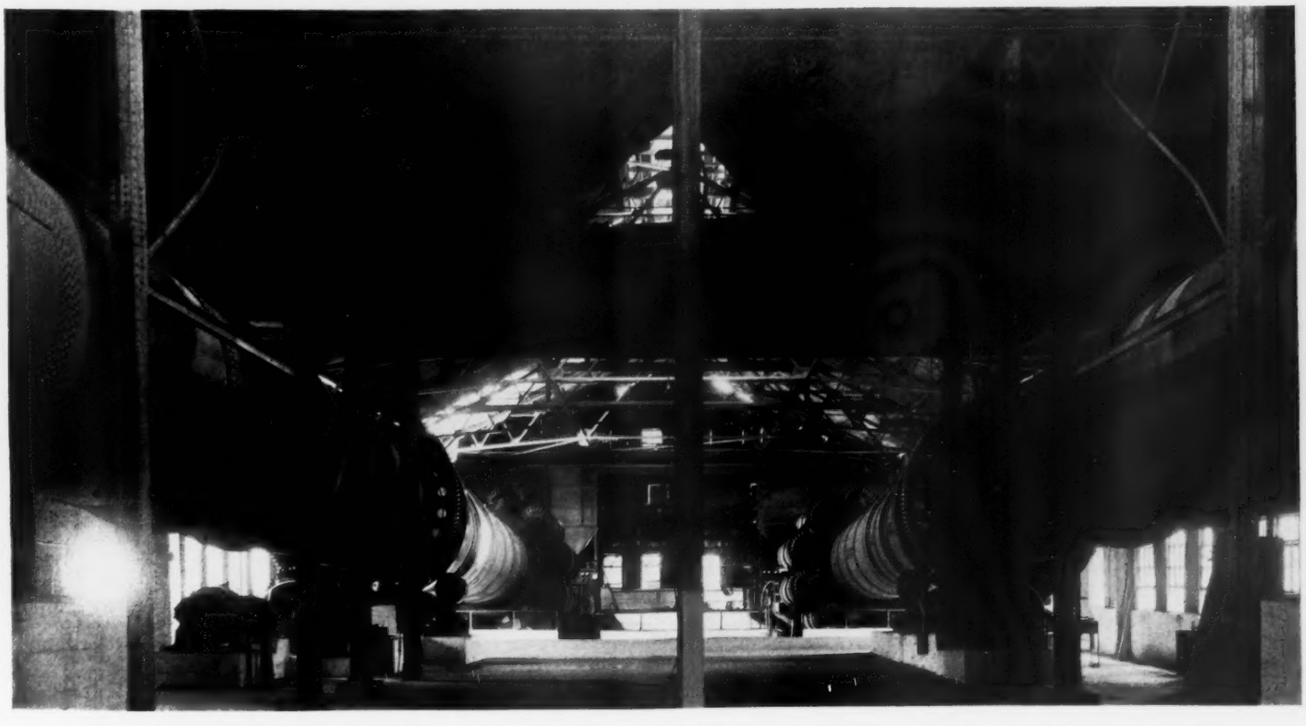


***Counter which records the speed and number of revolutions made by the kiln***

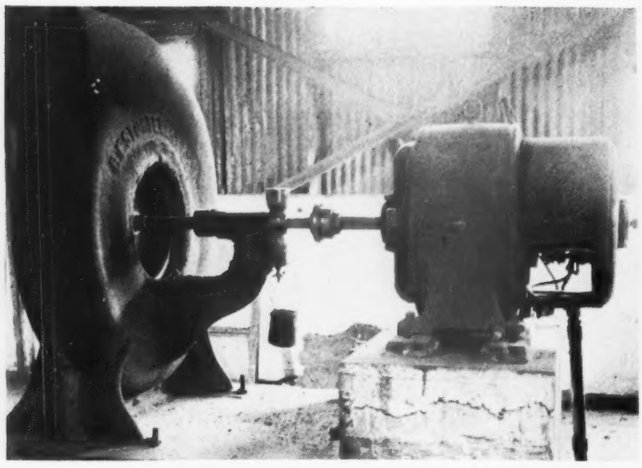
On the bucket line shaft there has been attached a square, four-point cam that contacts with a suitable metal finger, causing a red light to flash about every two seconds in the kiln room, and by this light the kiln operator knows that the buckets are functioning. Also, a recording instrument counts the number of revolutions of the buckets.

All the motors used in connection with the kiln operation, including the induced draft fans, coal blowers and coal screw feeders, kiln drive, are d. c., 550-v., variable-speed, light compound type manufactured by Bruce Peebles and Co., Ltd., Edinburgh, Scotland. They are all controlled from an F. L. Smidth and Co. "centralized kiln control" switchboard located on the burner platform.

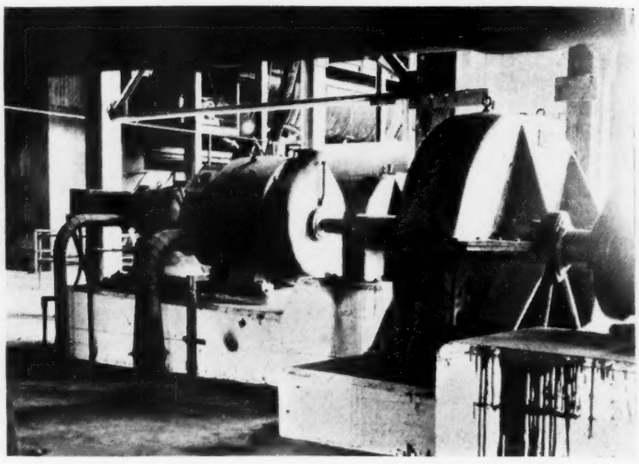
The motors also have General Electric Co. push-button switches that function from a place close to each motor as well. By means



***Two of the 10 ft. by 276 ft. kilns and coolers first installed; the space between was reserved for the third kiln***



*Variable speed motor driving fan which supplies air for the coal combustion*



*Each kiln is driven by a variable speed d. c. motor and a pair of speed reducers*

of the variable speed motors all the kiln operations can be easily and accurately controlled and each operation is synchronized and made to balance perfectly with the succeeding ones.

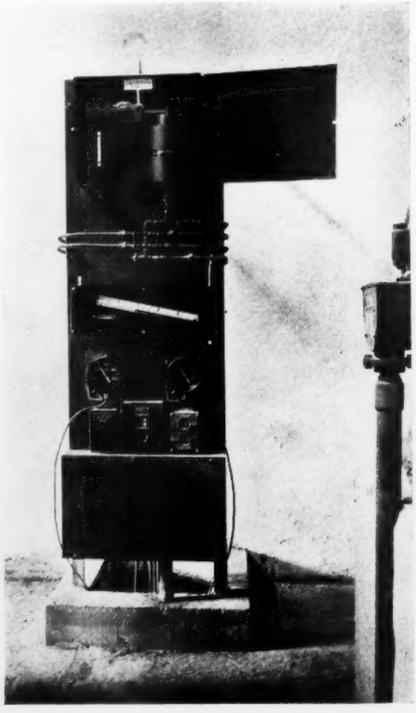
The slurry is fed to kilns, each of which is 287 ft. long and 10 ft. diameter. These three kilns replaced the four old 150-ft. by 10-ft. kilns. The first two kilns installed were made by cutting up and refitting the shells of the four older ones. The kiln added during the winter of 1928-29 is identical with the others except that its supporting bearings were equipped with Timken bearings and the drive is a set of fully enclosed gears direct-connected with the 75-hp. motor. Timken bearings were also used on the drive mechanism. The new kiln, bases and drives were supplied by the Traylor Engineering and Manufacturing Co. The first two kilns were built by the Power and Mining Co., of Milwaukee, now a part of the Allis-Chalmers Manufacturing Co.

For a certain distance in the feed end of the kiln, there is suspended a mass of chains to break up the slurry and act as a means of transferring heat to the cement material and retarding the outflow of dust as well. The discharge ends are provided with F. L. Smidth and Co. "Unax" coolers, devices likewise provided with a mass of suspended chains that function to absorb heat from the clinker, transferring that heat to the air passing to the kiln via the coolers. This use of chains is patented by F. L. Smidth and Co.

There are ten 4-ft. by 17-ft. Unax cooler cylinders attached to each kiln and these revolve with the kiln. The neck between the kiln and the cooler is made of a special heat-resisting alloy and for a short distance in each cooler the lining is of fire brick with the cold end of the cooler unlined but equipped with baffle lifters and the chains referred to above. The clinker leaves the coolers at a temperature of 250 to 300 deg. F.

The burning zones of the kilns are lined with 9-in. fire brick, and in the shell where the chains hang, the lining is 6-in. fire brick which covers a 2½-in. layer of Moler insulating brick. The section between the burning zone and the chain system has a Moler brick lining. The efficiency of this equipment is to be judged by the fact that only 98 lb. of coal is said to be required per barrel of clinker produced at capacities given, i. e., 1700 bbl. per day.

The kilns are each driven by 75-hp., direct-current, variable-speed motors,

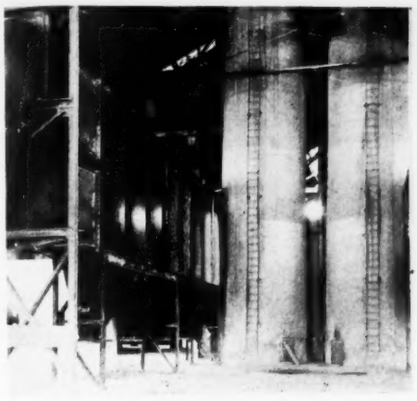


*Draft gages, pyrometers and other instruments on the panel controlling the exhaust gases*

450/1200 r.p.m., direct connected to a Kennedy-Falk, 900/148-r.p.m., type H speed reducer. This unit is directly connected to a second unit of the same make, 148/17.9 r.p.m., type 12-H. Falk-Bibby flexible couplings are used to connect all these units to their motors.

*Agitators of this type are used with the correction and mixing tanks*

The kiln-drive motors are direct connected on their outboard end to a 1.5 kw. 450/1200-r.p.m., 100/226-v., 2.63/3.25-amp., Bruce-Peebles a. c. alternator. This in turn is direct connected at its outboard end with an F. L. Smidth revolution counter which registers the number of revolutions and speed of kiln on the control board. The counter, alternator, drive motor, first and second reduction unit, are all set in a line. The motor is air-cooled by a self-contained fan ventilator that draws



***Dust hoppers in which some of the dust from the exhaust gases is collected before the gas passes to the stack***

the incoming air through a Midwest air filter, set inside the kiln room and to one side. All necessary pipe connections pass under the concrete floor to the motor, after which the warm air discharges to the room.

At the inlet end of each kiln are located draft indicating and temperature protection instruments on an F. L. Smidth and Co. panel. One stack is provided for all the kilns; connection is made by a common flue.

### *Kiln Control Boards*

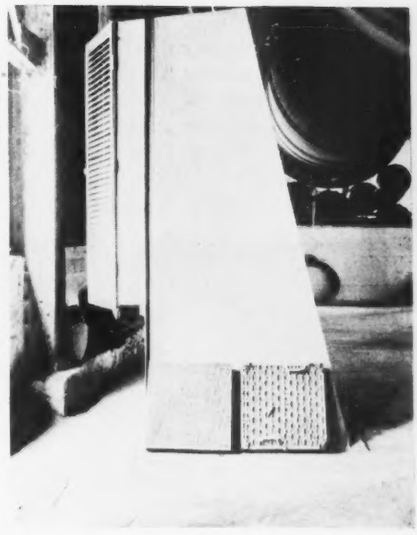
Situated at the discharge end of each kiln are the centralized kiln control panels, already mentioned, on which are mounted push-button switches for remote control of the variable speed motors used in connection with the clinker burning operation. Here are also mounted rheostats for controlling the speed of these same motors. The coal feeders, coal blowers, slurry feeders, kiln and draft fan motor controls are each mounted on separate sub-panels with their respective indicating amp. and volt meters. A Leeds and Northrup Co. indicating pyrometer is also mounted on this board, the hot point of which is at the inlet end of the kilns. Other equipment, draft indicators and a light that indicates whether or not the slurry pumps are functioning properly, are also mounted on this board. These three panels are the heart of the whole kiln operation and all speed changes, slurry flow, fuel, air supply, temperature and draft regulations are made here.

### *Coal Feeders*

Pulverized coal is delivered from the grinding plant to six small steel hoppers, two for each kiln. These bins are located in the kiln room behind the kiln control panels and each is served by two screw conveyor emptiers that discharge to a cross conveyor. One bin's set of two conveyors discharges to a right-hand flight, and the other bin's emptiers discharge to a left-hand flight, both flights being contained in the same conveyor housing. This cross conveyor delivers the products from the two bins to the centrally located conveyor discharge, where the pulverized coal is blown direct to the kiln by a No. 8 Sturtevant coal blower, direct connected to a 25-hp., 1375/1750-r.p.m., variable-speed motor. The six sets of coal screw conveyors for each kiln are each driven by a 5-hp., variable-speed motor, 800/1800 r.p.m., through a right-angle, size 100-AT, Cleveland 12:1 worm gear reduction unit. This speed gives a maximum and minimum range for the kiln operation.

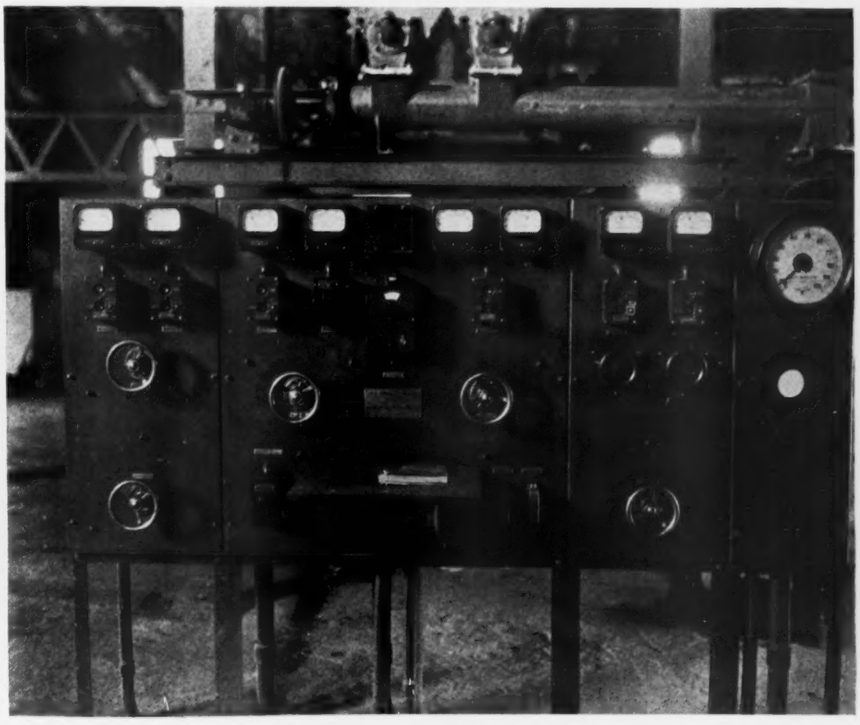
### *Clinker Conveyor and Storage*

The clinker discharge to a McCaslin conveyor that runs through a passage under the end of the kilns; the clinker travels for a short horizontal distance, when it is elevated and returned over the top of the kiln room to the clinker storage building. This conveyor is an endless type, similar to that used in the limestone storage, except that it is not used for reclaiming; a third McCaslin conveyor is used for that purpose. The clinker storage conveyor is 670 ft. long, has 334 buckets, 24x24-in., and is driven at the head pulley by a 13-hp., 900-r.p.m. Lancashire motor, belted to a set of open gears for speed reduction.



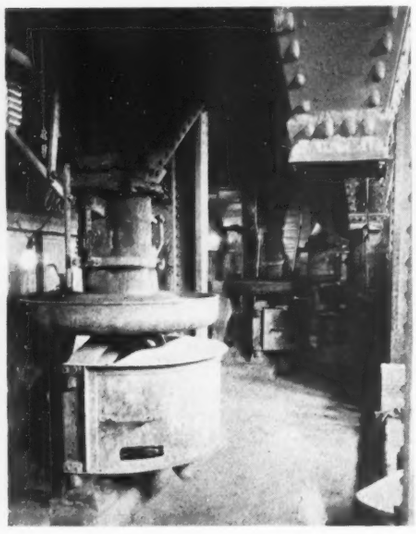
***Air filter for kiln drive motors. A filter section is shown***

The McCaslin conveyor passes over the top of the two large clinker storage piles that are alongside each other, the buckets dump to storage below, after which the bucket line passes down a tail shaft to a tunnel under the stock pile and returns to the kiln discharge hopper, completing the endless circuit. The storage pile has a capacity of 90,000 bbl. of cement clinker.



***A section of the control board; these panels have all the instruments pertaining to the kiln operations***

After the clinker has cooled sufficiently, it is drawn through gates located in the top of the reclaiming tunnel to a third McCaslin endless conveyor, which conveys and elevates the cold clinker to a hopper-bottomed steel storage bin that serves as a feed bin for the car which delivers the clinker to the finish-grinding



***One of the table feeders for feeding cold clinker to the dry mills***

Kominuters. This McCaslin conveyor is also used to unload the gypsum from a track hopper, delivering that product to gypsum storage alongside of and in the same shed as the clinker storage. The No. 3 McCaslin also reclaims and delivers the gypsum to a small hopper-bottomed steel bin alongside of and at the same elevation as the clinker car feed bin. The McCaslin No. 2 (hot clinker) and No. 3 (cold clinker) conveyors run parallel to each other. The latter has 290 buckets, 18- in by 24-in., and is driven by a 20-b.hp. Lancashire motor belted to a set of open gears at the head shaft. The cold clinker tunnel is ventilated by means of a No. 7 Sturtevant fan belted to a 10-hp. Canadian General Electric motor.

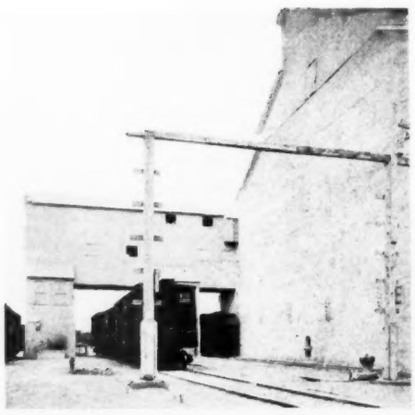
### *Finish Grinding*

The clinker from the steel hopper is drawn into a steel, bottom-dump, mine-type car holding 7 bbl. of material, after which the car is transferred to the adjoining bin, where a measured amount of gypsum is added by means of a measuring quadrant. The car is then shifted by an ingenious belt arrangement to the bins that feed the Kominuters, and is dumped. There are five No. 85 Kominuters, four of which are driven by 100-hp. Canadian General Electric motors and 18-in. belts. From the Kominuters the ground cement is conveyed and elevated to bins over the tube mills. The screw conveyors and elevators are driven by a 50-hp., 600 r.p.m. Canadian General Electric motor, by means of a 12-in. belt and countershaft.

The elevator discharges to a conveyor that distributes the material to a parabolic tank, which feeds six No. 18 F. L. Smidth tube mills. Each tube mill is driven by a 250-hp., 600 r.p.m., Canadian General Electric motor, through a Falk herringbone gear reduction. The motors used were originally 175 hp., but were re-wound at the plant for the heavier load.

The dry Kominuters have about 10,000 lb. of steel balls and are regulated so the discharge products will average 90% through a 14-mesh screen. This material is ground in the 6-ft. by 20-ft. tube mills containing 36,000 lb. of 1¼-in. special steel balls, so the finished product will have a fineness of 85% through a 200-mesh screen.

One of the No. 85 clinker Kominuters is equipped (as an experiment) with a reducer drive direct-connected to the main shaft. The speed reducer is a No. 12 Falk, the slow speed coupling is a No. 22 Falk-Bibby, the high speed coupling is a No. 14 Falk-Bibby, and the installation is motored with a 100-hp., 600-r.p.m. motor. It will be interesting to learn the outcome of this experiment after long and continuous operation, although it apparently is successful in the time it has been in use.

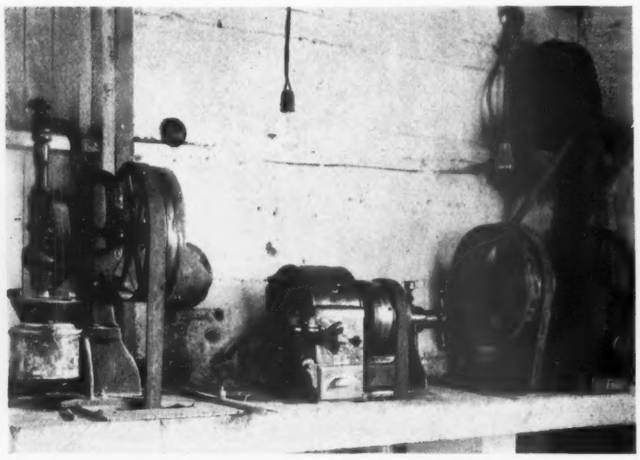


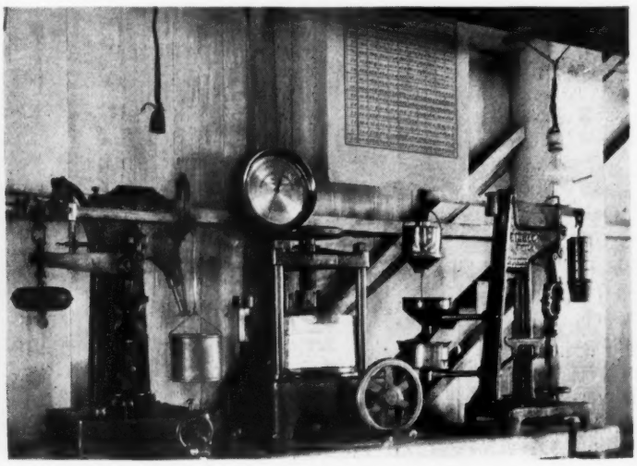
***Packing machines are housed in a structure directly over the loading tracks***

The tube mills discharge to a screw type conveyor delivering to a bucket elevator that serves an inclined 24-in. belt conveyor, carrying the cement to the concrete stock bins. There are two stock bins, No. 1 being 200 ft. by 100 ft. wide and 40 ft. deep; No. 2 has the same dimensions but is 50 ft. deep. Each stock bin holds about 250,000 bbl. of cement. The tube mills, off-bearing conveyor and elevator are driven by a 35-hp. motor, and the 24-in. belt conveyor is also driven by a 35-hp. motor.

### *Pack House*

The finished cement is drawn from the bottom of the stock bins by a series of parallel screw conveyors, all discharging to a cross screw conveyor. In each unit there are 10 conveyors, any one of which can be driven by the 13-hp. motor that is mounted on a truck and track, and which can be shifted from place to place as needed. The cross conveyor is belt-driven by a 25-hp. motor and discharges to a short conveyor that serves a bucket eleva-





***A section of the testing laboratory. A small grinding unit shows at the left and the briquet breaking equipment at the right***

tor. This cross conveyor is driven by a 20-hp. General Electric motor.

The bucket elevator discharges to a screw conveyor carrying the cement to the Bates packers, located across the tracks. This conveyor serves two 3-tube machines. The bucket elevator and screw conveyor are driven by a 25-hp. motor, and the Bates packers are driven by two 13-hp., 1140 r.p.m. motors. Pack house No. 2 is equipped similarly to No. 1. Adjoining the pack house is a store room supplied with both cotton and paper sacks, and facilities for counting, cleaning and repairing of cotton sacks.

### *Coal Grinding*

Coal is unloaded to a track hopper and elevated by a McCaslin conveyor that discharges and reclaims from a 12,000-ton capacity storage pile. The McCaslin is equipped with 272 buckets, 18 in. by 24 in., and is driven by a 10-hp. motor. Reclaimed coal discharges to two C. O. Bartlett and Snow driers driven from a line shaft by a 25-hp. motor. This motor and another 35-hp. electric motor drive the necessary fans, elevators, conveyors, etc., for the entire coal plant, including the equipment for delivery of powdered coal to the steel hoppers at the kilns. The coal is ground in seven Fuller-Lehigh mills, each belt-driven by a 50-hp. Canadian General Electric motor.

### *Power House*

Power purchased from the Winnipeg Electric Co. is delivered at the plant at 22,000-v., and is transformed by the power company to 550-v. in six Westinghouse oil-cooled transformers built in two banks of three transformers each. The direct current for the d. c. variable-speed motors used in the kiln operation is supplied by two synchronous a. c. motors direct connected to a d. c. generator. These motor generator sets are rated as 341-k.v.a., 3-phase, 60-cycle, 550-v., 358-amp., and operate at 1200 r.p.m.; the d. c. generator is rated at 300 k.w. The exciter is also direct connected to this unit and is rated at 34/48 amp., 36/50-v.

There are two of these d. c. generator units. They are driven by the synchronous motors described and one can be driven by an 8-cylinder Sterling Engine Co., model GRC-8 gas engine supplied by the Canadian Fairbanks-Morse Co., Ltd. This is an emergency drive in case the power supply fails from any cause. The engine is connected to the generator set by a Magnetic Manufacturing Co. magnetic clutch.

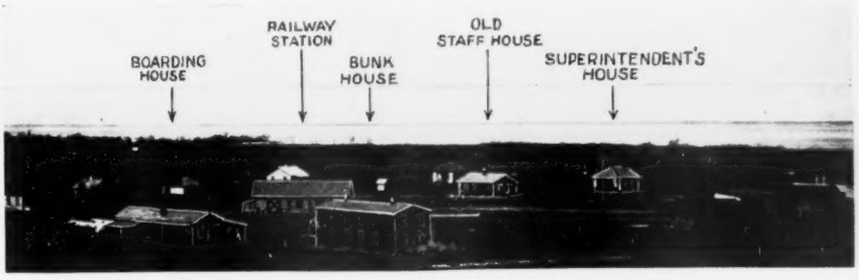
In the power house there is also a Canadian Ingersoll-Rand 1170-cu. ft. compound air compressor, operating at 100-lb. pressure and driven by a 250-hp. motor.

Air for agitation (55-lb. pressure) is supplied by a second and smaller Ingersoll-Rand compressor, connected by 12-in. belt to a 75-hp. Canadian General Electric motor. The compressors are equipped with "Protectomotor" air filters, made by the Staynew Filter Corp., Rochester, N. Y. The air is delivered to a 5-ft. by 12-ft. vertical high-pressure cylinder through a 6-in. line. Alongside this receiver is a second, 4 ft. by 10 ft., and the two are connected by a suitable air pressure reducing valve so that the 100-lb. air pressure can be reduced to 55-lb. for agitation if desirable.

***Small vibrating screen in the laboratory***

### *Auxiliary Buildings*

The plant has excellent facilities for taking care of all necessary repair work. There is a carpenter shop and a separate shop for making patterns for castings. The buildings housing the newly installed wet process equipment are of reinforced steel and concrete. All stairs and walkways are of steel and Kerlow Steel Flooring Co. floor treads used throughout.




***Housing arrangement at the Canada Cement Co.'s Manitoba plant***

### *Testing Laboratories*

The company maintains a well organized physical and chemical laboratory housed in the same building as the office, in which the usual type of equipment for accurately controlling the quality of the finished product has been installed.

Portland cement in Canada is required to pass the same specifications as are standard in the United States. The Canadian Engineering Association specifications, however, specify a lower magnesia and insoluble residue than the A. S. T. M. specifications, the limits being 4.0% magnesia and 0.75% insoluble residue. A typical analysis of the cement made at this plant is as follows:

| | Per cent |
|---|---|
| Silica | 20.92 |
| Alumina | 6.20 |
| Ferric oxide | 2.88 |
| Lime | 64.26 |
| Magnesia | 2.60 |
| Sulphuric anhydride | 1.80 |
| Loss on ignition | 0.76 |
| | 99.40 |

PHYSICAL TESTS

| | Setting time |
|---|---|
| Initial set | 2 hrs. 5 min. |
| Final set | 4 hrs. 15 min. |

Per cent water N. C.—24%.

Fineness—84% passing No. 200 sieve.

TENSILE STRENGTH
(1:3 standard sand mix)

| | | | | Ave. |
|---|---|---|---|---|
| 7 days.... | 315 | 325 | 330 | 323 |
| 28 days.... | 410 | 405 | 420 | 412 |

### *Miscellaneous, etc.*

The engineering work in connection with the change from dry to wet was performed by F. L. Smidth and Co. in collaboration with the engineering department of the Canada Cement Co., as was also the electrical layout.

The company has recently changed its Hull, Que., plant from the dry to the wet process, based no doubt on the operation success at the Manitoba plant.

The executive offices of the Canada Cement Co. are in the Canada Cement Bldg., Phillips Square, Montreal. The officers are: A. C. Tagge, president; J. D. Johnson, general manager; W. O. Bovard, general sales manager; F. B. Kilbourn, general superintendent; A. G. Fleming, chief chemist, and O. S. Barr is chief engineer. The sales for this plant are directed from the downtown office of the company in Winnipeg.

The operating personnel consists of: J. R. Dowrie, superintendent; C. J Murphy, plant chemist; Louis de Tilluel, quarry superintendents; R. L. Nichols, general foreman; A. Stewart, repair foreman, and F. Harper, chief electrician.

*General view of the new Paul Ales plant of the Material Service Corp., Lockport, Ill.*

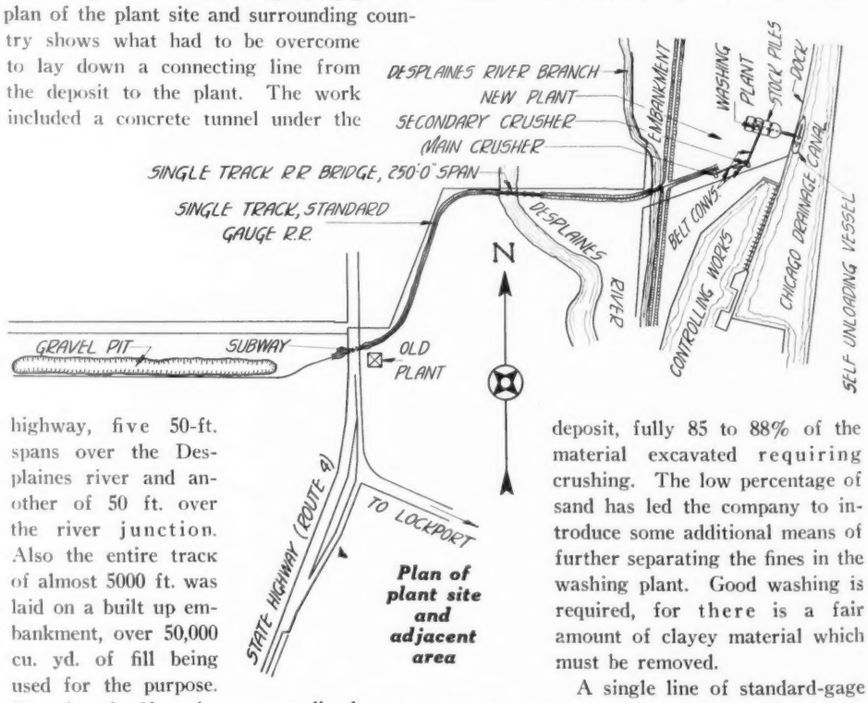
# New Paul Ales Plant, Material Service Corp.

## Modern 600-Ton per Hour Gravel Plant at Lockport, Illinois, Markets Material in Chicago Territory—Ships by Specially Designed Low-Built, Self-Unloading Motor Ship

THE NEW Paul Ales plant of the Material Service Corp. is one of the most recent modern types of a sand and gravel plant that has yet been built in the central states territory or for that matter in the entire country. It was erected to serve a deposit which is quite large and sufficient in material to supply the company over a long period of years; this was determined by careful prospect work. As an added precaution for long operation, the company has leased an adjoining 150 acres of gravel land. The plant represents an investment of $500,000, which amount appears to be entirely justified considering the heavy production ensuing from its operation.

Simplicity and sound engineering principles feature this plant, which is designed to produce 600 tons per hour. At that rate of production any lost time from machinery getting out of order would cause serious monetary loss and with this in mind the company did not salvage a single piece of equipment, conveyor belts, etc., from the old plant nearby which they dismantled. Some of this equipment might have served and probably still has a long operating life left, but the management was taking no chances. Production, continuous and maintained, was the order and every condition to carry it out was met.

The plant is strategically located on the west bank of the Chicago drainage canal. It is about 5000 ft. away from the deposit and the old plant; this factor of location had to be carefully worked out before the final decision to build was made, for the intervening country presented some transportation difficulties. The old Paul Ales plant shipped by truck into Joliet and Lockport and was located right at the junction of the two main highways, but under the new scheme all shipments are made into the Chicago district by water, hence the new location. A glance at the accompanying ground plan of the plant site and surrounding country shows what had to be overcome to lay down a connecting line from the deposit to the plant. The work included a concrete tunnel under the highway, five 50-ft. spans over the Desplaines river and another of 50 ft. over the river junction. Also the entire track of almost 5000 ft. was laid on a built up embankment, over 50,000 cu. yd. of fill being used for the purpose. The plant itself, as is apparent, lies between a branch of the Desplaines river and the Chicago drainage canal.




**Plan of plant site and adjacent area**

### Deposit

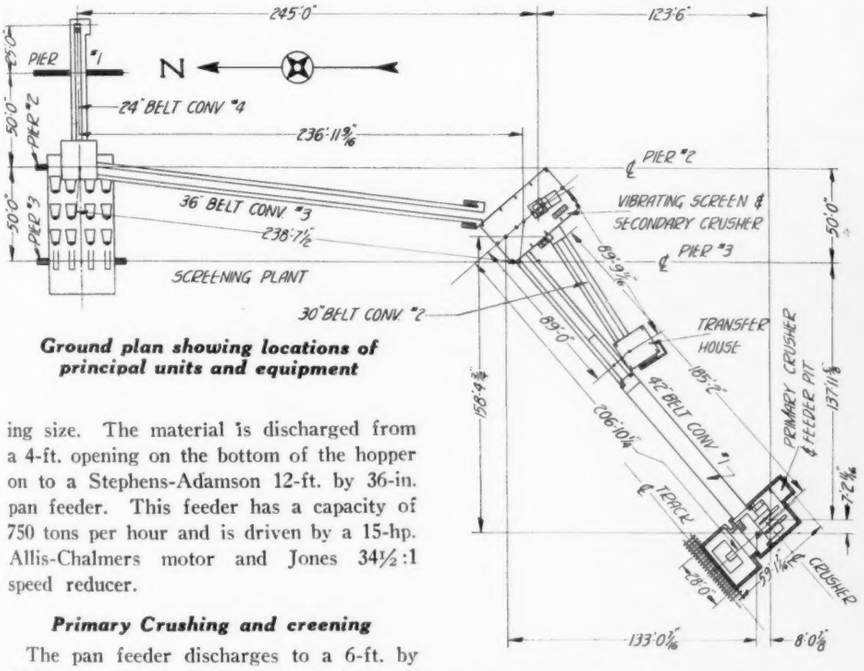
The present deposit comprises about 100 acres and is being worked as an elliptical opening; the long axis is about 2500 ft. and the short axis is 400 ft. There is about 3 ft. of overburden and this is removed by a No. 8 Osgood gasoline shovel equipped with a 1¼ yd. Page bucket loading to motor trucks. Large boulders predominate in this deposit, fully 85 to 88% of the material excavated requiring crushing. The low percentage of sand has led the company to introduce some additional means of further separating the fines in the washing plant. Good washing is required, for there is a fair amount of clayey material which must be removed.

A single line of standard-gage loading track, running nearly parallel with the banks, has been placed in the pit. Suitable switchbacks and short connecting feeders facilitate the operation. Excavation is by means of a Bucyrus 70-C steam shovel on caterpillars, equipped with a 3-cu. yd. bucket, loading to Western 15yd. side-dump cras. The cars are hauled to the receiving hopper in trains

of four cars each by either of two 25-ton Davenport steam locomotives or the Vulcan 38-ton steam locomotive. The locomotives were all purchased new on the recommendation of Fred W. Herkel, the superintendent, who has had over 25 years' experience with all types of locomotives, gained at different quarries in the middle west. Mr. Herkel's experience will be embodied in a forthcoming article in ROCK PRODUCTS and will include cost and operating comparison on the various types of locomotives.

The receiving hopper is a concrete-walled pit, 16 ft. square and 14 ft. deep, placed alongside the track at a distance of about 3500 ft. from the deposit. It holds about 100 cu. yd. of rock. The cars are dumped over a rail grizzly, 16 in. clear opening placed over the hopper. Large boulders retained on the cars are sledged down to pass-

***The deposit is being worked as an elliptical cut***




***Ground plan showing locations of principal units and equipment***

ing size. The material is discharged from a 4-ft. opening on the bottom of the hopper on to a Stephens-Adamson 12-ft. by 36-in. pan feeder. This feeder has a capacity of 750 tons per hour and is driven by a 15-hp. Allis-Chalmers motor and Jones 34½:1 speed reducer.

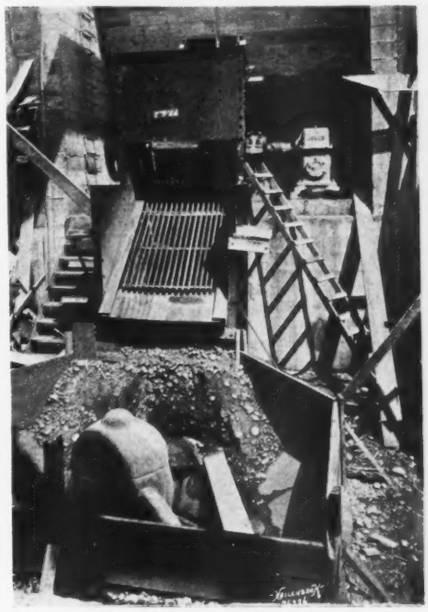
### *Primary Crushing and creening*

The pan feeder discharges to a 6-ft. by 36-in. bar grizzly, inclined at 40 deg., and made up of 6-in. bars, 2½-in. clear opening. Throughs of the bar grizzly go to the No. 1 conveyor and oversize falls to the primary crusher, a No. 10 Superior "McCully," driven by a 125-hp. motor and Tex-rope drive, which reduces the stone to 4-in. and under.

The spider arms of the gyratory crusher are protected from possible damage of heavy boulders by a home-made shield made of steel plate. A Chisholm-Moore hand-operated 40-ton chain hoist running on an I-beam trolley over the crusher was used to place the crusher and now serves to take out any exceedingly large boulders which might choke the crusher.

The discharge of the crusher joins the material passing the grizzly and both are carried by the No. 1 conveyor to the primary screens. For simplification, the details of all the conveyors are given and henceforth each will be designated by number.

The No. 1 conveyor discharge is split into two hoppers, either of which feeds a battery of two Robins "Gyrex" vibrating screens; the screens in each battery are mounted one above the other so that the oversize material has to pass over both before passing to the secondary crushers. Each of these screens has a 10 deg. slope; all are 42 in. wide by 6 ft. long, single-decked, and have manganese steel wire cloth with 2-in. square openings. The screens are driven by individual 5-hp. motors through Tex-rope drives. Oversize passes to hoppers feeding the secondary crushers and the throughs go to the No. 3 conveyor running to the washer.



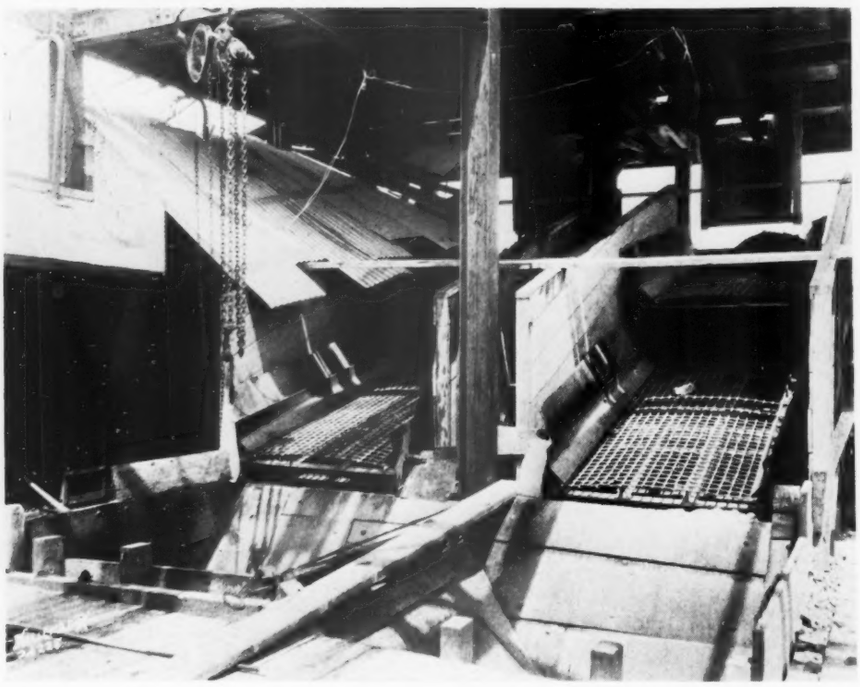
***Fan feeder, bar grizzly and primary gyratory crusher***

Both secondary crushers are 4-ft. Symons cones set for a 1-in. opening, and each is connected by a Falk coupling to a 125-hp. electric motor. The discharge of the sec-

BELT CONVEYOR DETAILS

| No. | Carrying material from | Length | Slope | Belt width | Drive |
|---|---|---|---|---|---|
| 1 | Primary crusher to primary screens | 216 ft. 8 in. | 19 deg.+ | 42 in. | 75-hp. and 36:1 Jones 300-D reducer. |
| 2 | Secondary crusher to transfer house | 91 ft. 8 in. | 16 deg.+ | 30 in. | 15-hp. and 36:1 Jones No. 21 reducer. |
| 3 | Primary screens to washing plant | 250 ft. | 18 deg.+ | 36 in. | 60-hp. and 36:1 Jones 300-D reducer. |
| 4 | To stockpiles (7/16 in. to 1⅛ in.) | 90 ft. | Horizontal | 24 in. | 15-hp. and 36:1 Jones reducer. |
| 5 | Tunnel under stockpiles | 291 ft. | Horizontal | 42 in. | 75-hp. and 42:1 Jones 300-D reducer. |
| 5A | Tunnel exit to shuttle hopper | | 20 deg. | 42 in. | Diamond chain. |
| 6 | Shuttle to boat | 50 ft. | Horizontal | 48 in. | 5-hp.* and 36:1 Jones worm gear reducer. |

*Reversible motor.



*Two sets of vibrating screens make the primary separation*

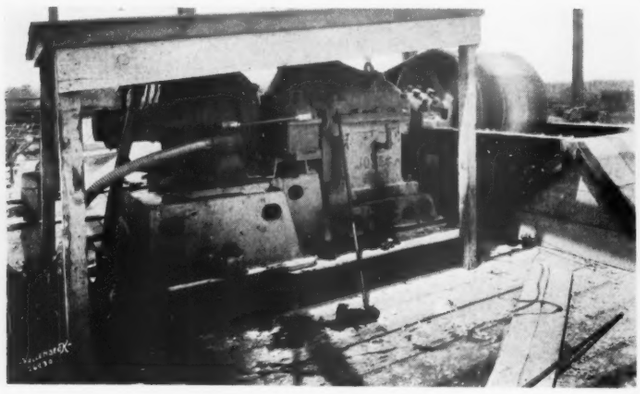
empty; material on the belt raises the lever arm, causing the valve to open and the water to pass into the spray pipe. Thus an antomatic washer is provided which serves a good purpose at this plant, for it helps break up the dirt nodules and thus facilitates the further washing in the scrubber screens.

Each set of vibrating screens can be operated independently of each other and the oversize can be passed as desired to either of the two Symons crushers. Likewise, the crushers can be operated independently. All controls for this equipment are on the screening floor; here are also "start" and "stop" buttons for the No. 1, No. 2 and No. 3 conveyors. The conveyors are all equipped with home-made devices for cleaning the under side of the belt; a perforated pipe sprays it with water and a rubber scraper pressed against the surface of the belt scrapes off the loosened mud, which then drops to a trough directly underneath. The trough is fully enclosed and has a small opening at the bottom connected by a 4-in. drain pipe through which the dirt and water are carried to waste. This method not only prevents clogging the belt but also eliminates

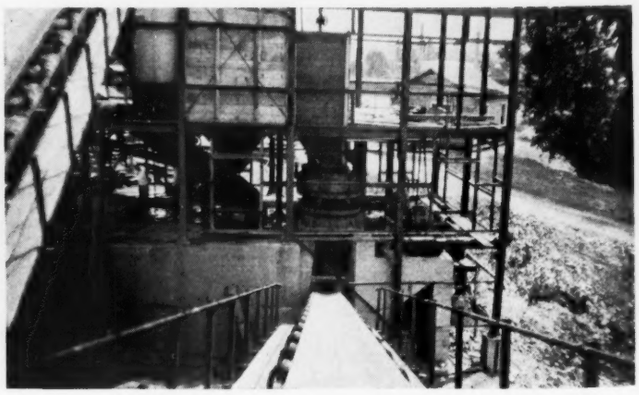
ondary crushers is chuted to the No. 2 conveyor, which carries it back to the transfer house, where it falls through steel hoppers on to the No. 1 belt and again passes over the primary vibrating screens.

The material on the No. 3 conveyor (minus 2-in. and sand and dirt) is subjected to a strong water spray at a point near the tail end of the belt. This spraying is done automatically by means of a simple little device of Mr. Herkel's which operates as follows: A 1½-in. pipe, one end of which is blocked off and the other end connected to a water line, runs across the belt width and about 12 in. above it. The pipe is perforated by 1¼-in. holes, spaced 1 in. apart along the length. A quick-acting Crane valve has been put between the pipe and water line; this is operated by a 4-ft. lever arm, placed in the same direction that the belt runs. The end of this arm clears the belt by about ½ in. when the belt runs

*The transfer house shows at the extreme right; primary screening and secondary crusher house, right center*



*All belt conveyors are driven through speed reducers*

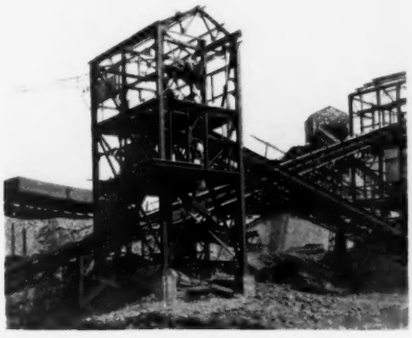


*Looking down the No. 2 conveyor toward the cone crushers*

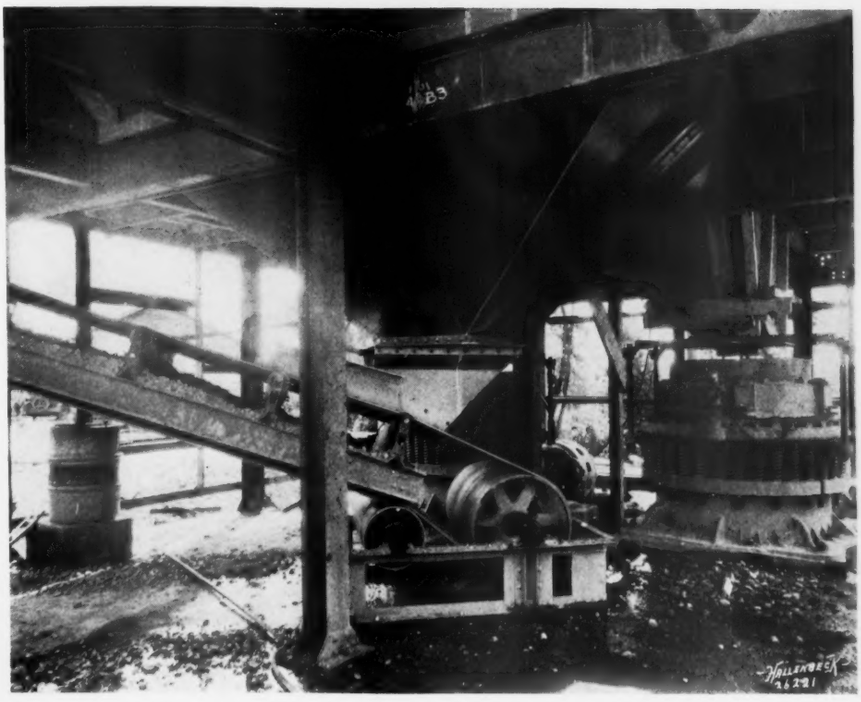
carrying this dirt to the storage pile, where it might contaminate the clean stone.

### *Washing*

Discharge of the No. 1 conveyor is split to two steel chutes which in turn again split the material to two other chutes, each of which feeds a Gilbert conical scrubbing screen, 84 in. long by 48 in., 36-in. diameter, covered with 1¼-in. perforated plate. The material is washed by 3-in. sprays in the chutes and more water added at the scrubber by a 3-in. line. It was found that additional water was needed in the scrubber, so a 2½-in. supplemental spray line has been put in to supply it.



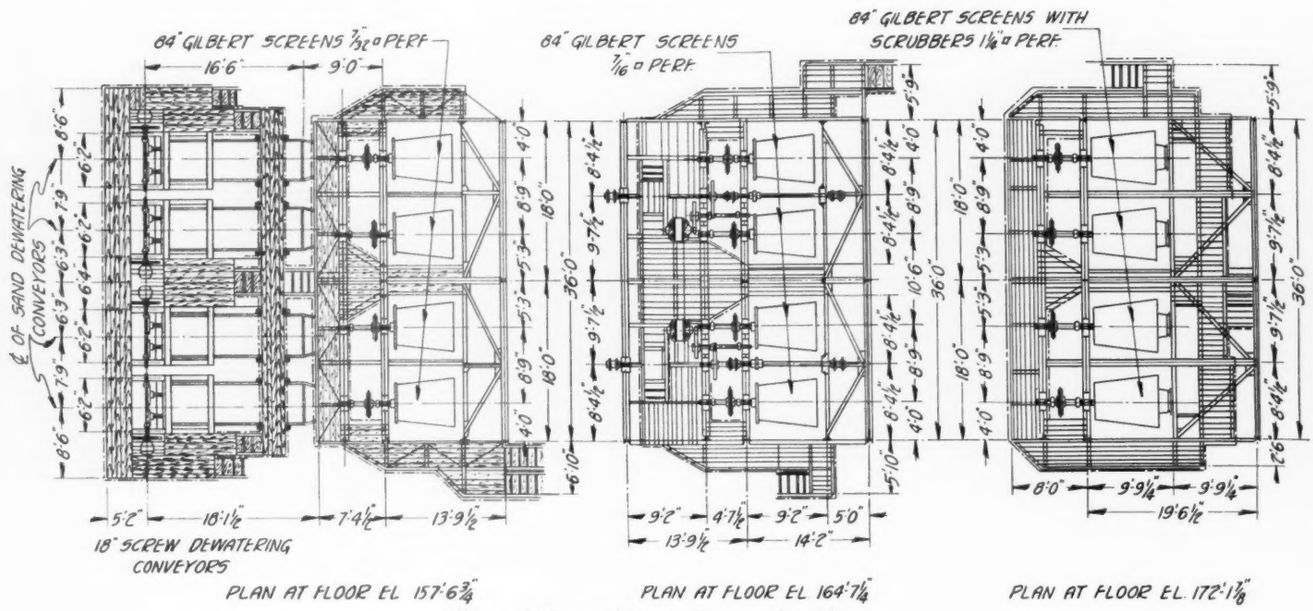
***The transfer house; all material from the secondary crushers is carried here and chuted to the No. 1 conveyor running to the primary vibrating screens***



***Two 48-in. cone crushers used for secondary crushing***

The rejects from the first screen in the series, 2-in. to 1¼-in., are chuted to ground storage as roadstone, and the throughs passed to a second and lower set of four Gilbert screens; each of these has the same dimensions as above, but has 7/16-in. wire cloth. Material rejected by this screen, 1/16-in. to 1¼-in., is chuted to the No. 4 conveyor, which carries it to ground storage. The third and lower set of screens, similar in dimensions to the above but covered with 7/32-in. wire cloth, receives the throughs of the second series; the rejects, 7/32-in. to 7/16-in. gravel, are chuted to another part

***The main washing and screening plant as seen from the crusher house; the stockpiles of different sizes are underneath the plant structure and the stockpiling conveyor (No. 4) shows at the right***

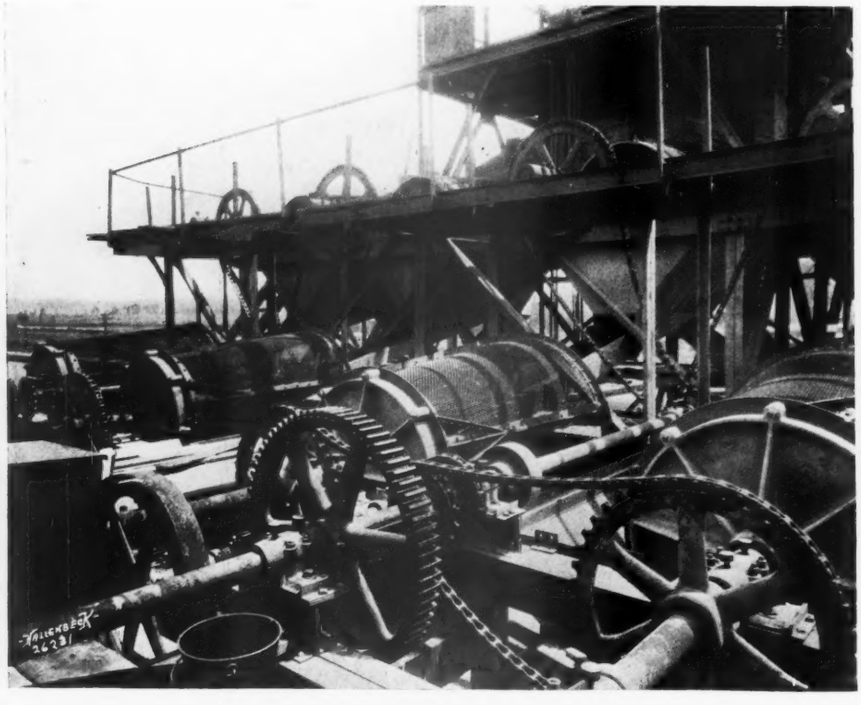

84" GILBERT SCREENS 7/32" ø PERF.
84" GILBERT SCREENS 7/16" ø PERF.
84" GILBERT SCREENS WITH SCRUBBERS 1¼" ø PERF.
℄ OF SAND DEWATERING CONVEYORS
18" SCREW DEWATERING CONVEYORS
PLAN AT FLOOR EL 157'6¾"
PLAN AT FLOOR EL 164'7¼"
PLAN AT FLOOR EL. 172'1⅞"

***Plan of the washing and screening plant***

of the ground storage and the 7/32-in. down passed to the double-screw sand washing boxes. There are four of these wooden washing boxes, with 18 deg. slope, each 19 ft. 2 in. long, 5 ft. 4 in. wide and 8 ft. 6 in. deep. The lower ends of the boxes have two baffles which extend 18 in. from the top and 3 ft. apart, and it is over these baffles that the waste water and mud flow to waste. The arrangement is such that only a small amount of the wanted fines are wasted with the effluent. Sand, 7/32-in. down, is chuted to storage below.

Each set of six screens is driven as a unit by a 40-hp. motor through gear-and-pinion and gear-and-sprocket chains. The washers are also combined in units of two each; a 15-hp. motor driving through gear-and-sprocket chains and gear and pinions serves each unit. Thus it can be seen that one-half of the washing plant may be operated if desired. All the screens are supplied with water from 3-in. lines tapped from the main 12-in. line. Waste water and dirt are flumed to a sump close by.

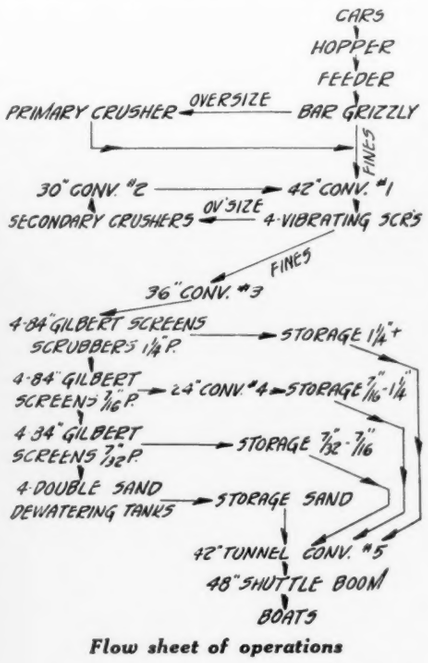
Under the present arrangement only one size of roadstone is made, 1¼-in. to 2-in.; two sizes of concrete aggregate, 7/16-in., to 1¼-in. and 7/32-in. to 7/16-in.; one size of sand, minus 7/32-in. The company intends to install two single-deck 36-in. by 6-ft. Universal vibrating screens to take the rejects of the 7/32-in. Gilbert screen and make a No. 5 gravel, 7/16-in. to 5/16-in.



***The main sizing screens and their drives***

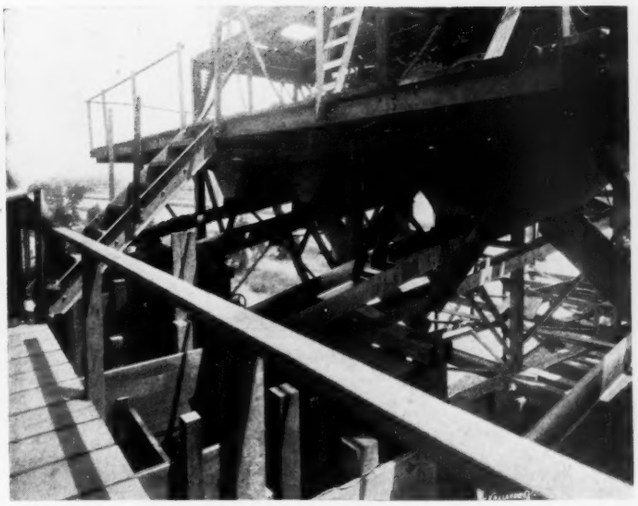
### Storage

All the gravel and sand as prepared is ground-storaged directly beneath the washing plant. The foundation walls for the steel framing of the building have been extended for 30 ft. and serve as dividing walls

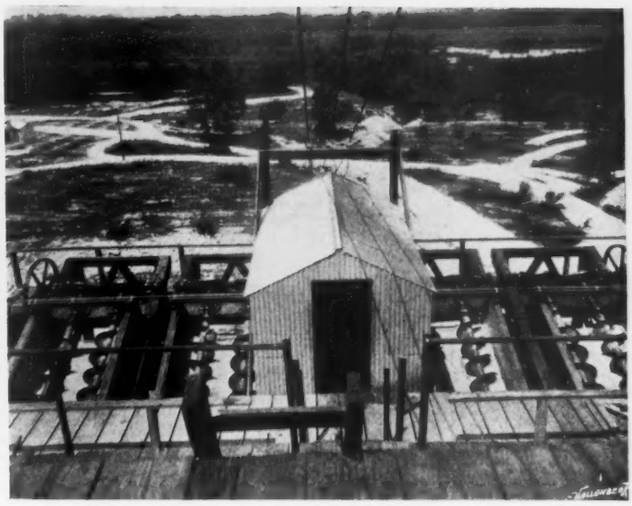



***Flow sheet of operations***

for the different sizes. These piles are directly over a concrete reclaiming tunnel, 240 ft. long, 7 ft. 6 in. high and 9 ft. inside width, in which the No. 5 conveyor runs. The roof of this tunnel is fitted with 18-in. hand-operated quadrant gates, spaced along its length about 12 ft. 6 in. apart. Any size or



*Fines from the sizing screens are chuted to the sand washers*



*Looking down into the sand washing boxes. The motors are housed in the structure between the boxes*

combination of sizes desired is drawn through these gates to the No. 5 conveyor below, which discharges to the No. 5-A conveyor; this latter conveyor carries the material to the top of the hopper feeding the No. 6 or boat loading conveyor. The material before going to the No. 6 conveyor passes over a stationary screen, 60 in. wide by 14 ft. long, the bottom of which is covered with steel plate, ¼-in. square perforations. While on this screen the material is subjected to a strong washing spray from nine washing pipes located along the length. Each pipe is blocked at one end and has ¼-in. holes, 1 in. apart, and is supplied with water at 70-lb. pressure. All the waste water and dirt from this rinsing is collected in a hopper trough beneath the screen and flumed to waste. This final washing of material before loading is deemed necessary at the plant. As a further precaution against possible dirt contamination from the belt, an underside scraper unit as previously described has been installed on the No. 5-A and No. 6 belts.

*Another view of the wet screening plant*

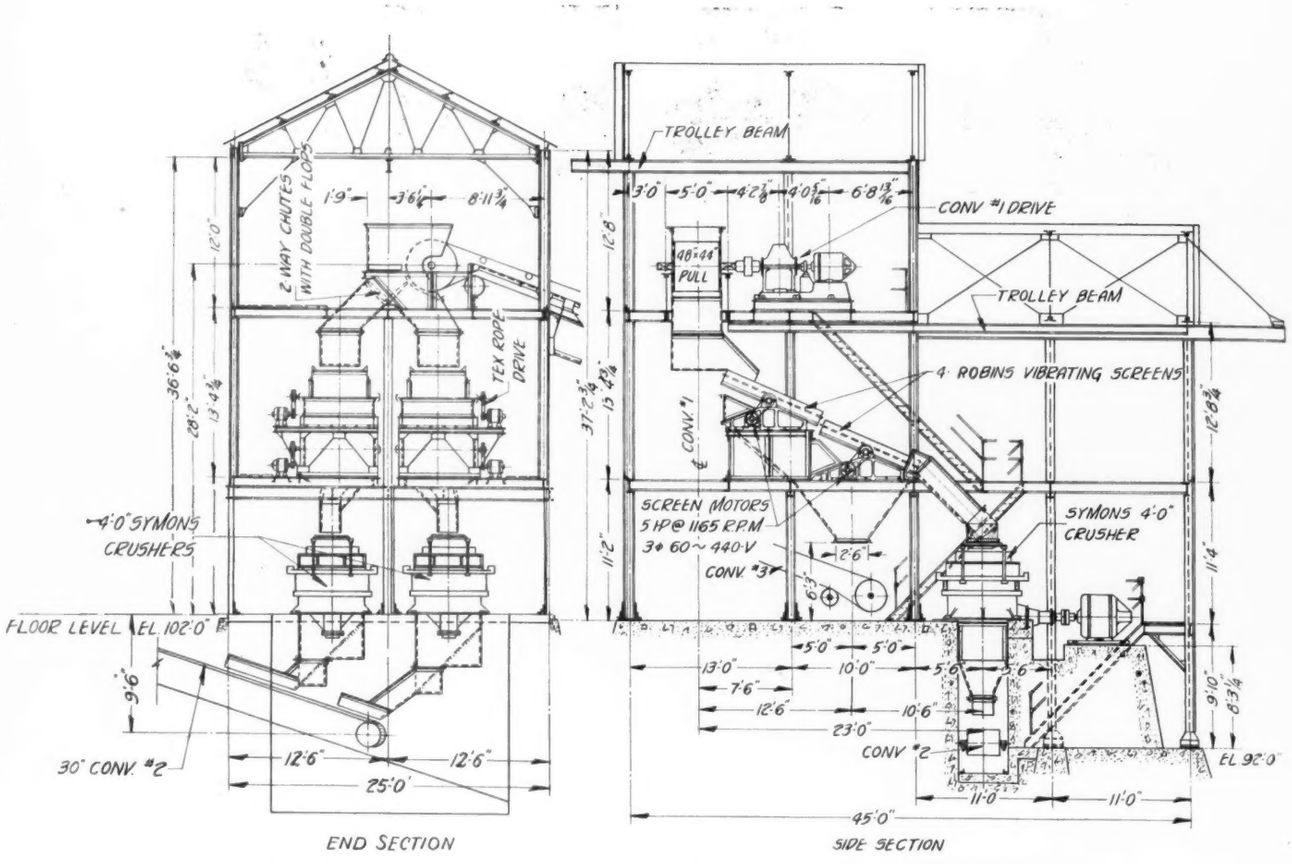
In loading sand, the material is allowed to by-pass the screen and drop directly to the chute feeding the shuttle conveyor.

The No. 6 belt is the shuttle conveyor used for loading the boat. This is a 48-in. by 50-ft. reversible conveyor running on a Stephens & Adamson "Simplex" 3-idler carrier, the whole mounted as a unit on a 66-in. steel truck body with flanged wheel made to run on a special track. A 5-hp. reversible motor supplies power for the travel of the unit, and another 5-hp. motor with 36:1 Jones speed reducer is used to drive the conveyor belt. The shuttle track can be hoisted to allow loading of boats at high-water periods.

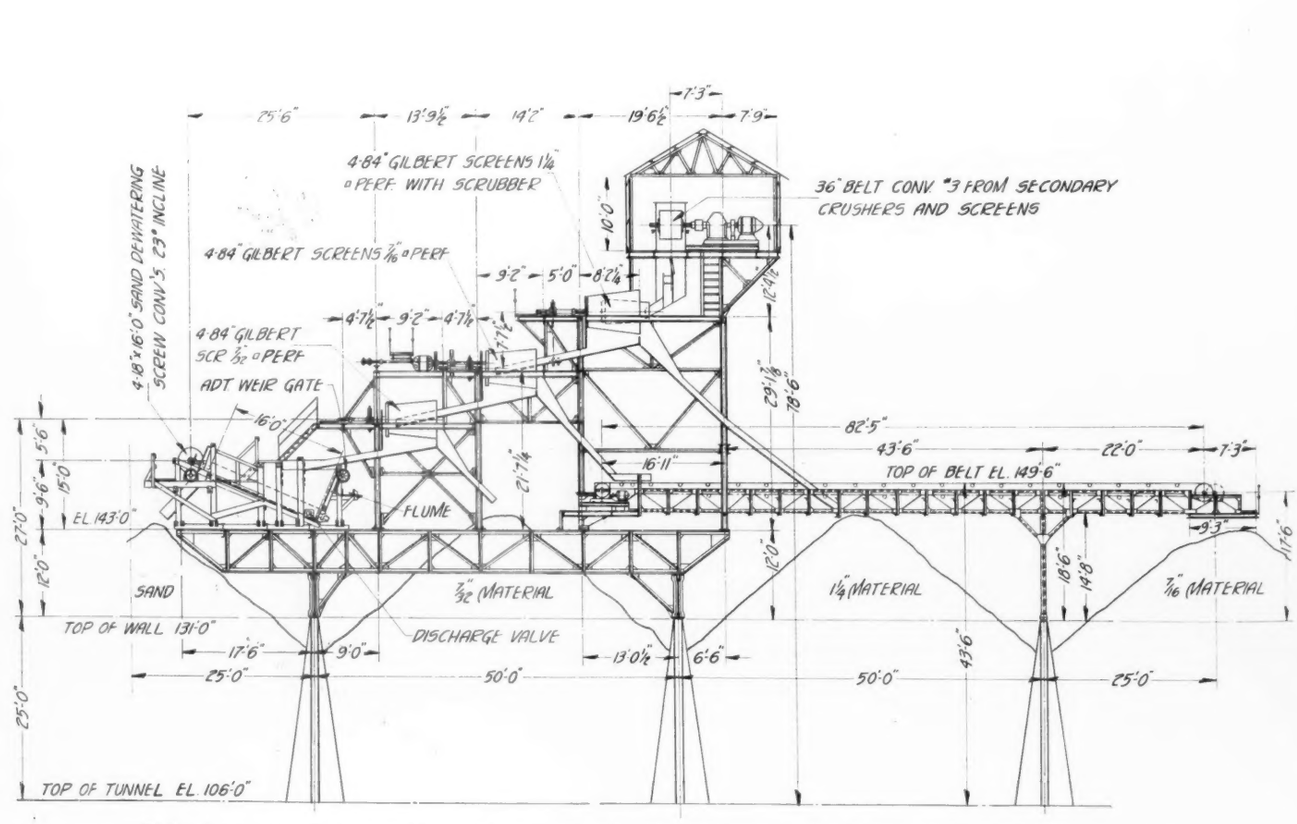
Boat loading is controlled at the head house at the dock. Here are placed all controls for operation of the shuttle conveyor (No. 6), reclaiming tunnel conveyors (Nos. 5 and 5-A), and the hoist mechanism for raising the shuttle track. Two men only are required to load the boat; one man at the head house signals the gate operator in the tunnel the type of material that is wanted. This is all done by a series of colored lights which have worked to perfection.

The concrete dock at the plant is 3000 ft. long and alongside this bin storage for truck loading is now under construction; the bin will hold about 1000 cu. yd., and a

*Stockpiles of gravel rest over a concrete tunnel in which a reclaiming belt runs*




***End and side elevators of the primary screening and secondary crushing structure***


4-84" GILBERT SCREENS 1¼" □ PERF. WITH SCRUBBER
36" BELT CONV. #3 FROM SECONDARY CRUSHERS AND SCREENS
4-84" GILBERT SCREENS 7/16" □ PERF.
4-84" GILBERT SCR 7/32" □ PERF.
4'-8"x16'-0" SAND DEWATERING SCREW CONV'S. 23° INCLINE
ADT WEIR GATE
FLUME
TOP OF BELT EL. 149'-6"
EL 143'-0"
SAND
7/32" MATERIAL
1¼" MATERIAL
7/16" MATERIAL
DISCHARGE VALVE
TOP OF WALL 131'-0"
TOP OF TUNNEL EL. 106'-0"

***Side elevation of the washing and screening plant. The general details of the stockpiling system, partition walls, etc., are indicated***

*The stockpiling conveyor (foreground) and the conveyor carrying material from the tunnel to the boat loading structure at the dock. The flume (right center) carries dirt to waste*

24-in. conveyor from the plant to feed these bins will be soon installed. A small concrete tunnel under the roadstone stock pile allows for future installation of feed gates for an underneath conveyor to carry this material back to the Symons crushers for recrushing for asphalt paving material. Some batching of aggregates is done at the plant, two 30-yd. wooden volumetric batching bins having been installed. These are served by the Osgood No. 8 gasoline shovel with 1¼-yd. Kiesler clamshell bucket, reclaiming from the stock piles. The company loads sand to trucks by a Barber-Green and Nelson loader.

Present live storage is about 30,000 tons and this will be increased by 100,000 tons in anticipation of winter demands when the plant is not in operation. The new storage area will be near the screening plant and served by a Beaumont slackline cableway system just purchased but not yet installed. A movable head tower and 4-cu. yd. scraper bucket will be employed to stock and reclaim material for boat loading.

### *Pump House*

All washing water is taken from the Desplaines river, a pump house on the bank being maintained for the purpose. There are three 8-in. Gould centrifugal pumps, each rated at 1900 g.p.m. and driven by individual 125-hp., 1750-r.p.m. Allis-Chalmers induction motors. The pumps have a screened 10-in. intake line and their discharges converge into a single 18-in. line outside the pump house. This line, all of which is American spiral pipe, carries the water 500 ft. to other 12-in. steel pipe lines at the washing plant. The pumps are primed by a 2-in. Economy centrifugal pump driven by a 3-hp. Howell motor, which also supplies water for the steam locomotives, concrete mixers, or other places where small amounts of water are needed.

All the pumps are equipped with Crane check and gate valves, American injectors, and their motors have Cutler-Hammer controls. Starting and stopping controls, safety switches (Square D) are all located in the pump house.

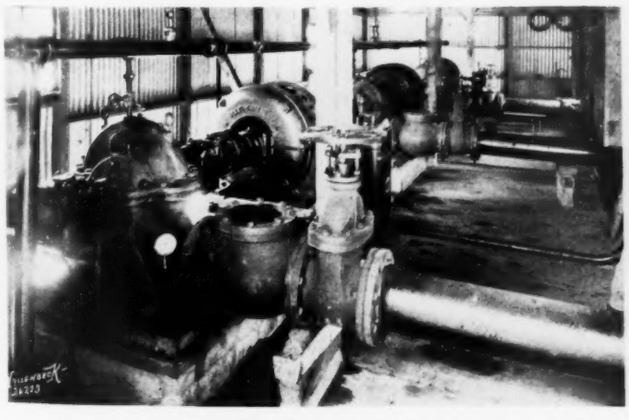
Power is purchased at 33,000 v. and stepped down to 440 v. in a Westinghouse three-transformer outdoor substation. The total horsepower to operate the plant is 1138 and its distribution follows:

MOTOR SCHEDULE

| Equipment | Hp. rating | Drive |
|---|---|---|
| No. 1 conveyor | 75 | Jones reducer |
| No. 2 conveyor | 15 | Jones reducer |
| No. 3 conveyor | 60 | Jones reducer |
| No. 4 conveyor | 15 | Jones reducer |
| No. 5 conveyor } | 75 | Jones reducer |
| No. 5A conveyor } | | Diamond chain |
| No. 6 conveyor | 5 | Jones reducer |
| Shuttle carriage | 5 | |
| Robins "Gyrex" | 5 | Tex-rope |
| Robins "Gyrex" | 5 | Tex-rope |
| Robins "Gyrex" | 5 | Tex-rope |
| Robins "Gyrex" | 5 | Tex-rope |
| No. 10 crusher | 125 | Tex-rope |
| S-A pan feeder | 15 | Jones 34½ :1 reducer |
| No. 4 crusher | 125 | Falk coupling |
| No. 4 crusher | 125 | Falk coupling |
| (6) Gilbert screens | 40 | Gear and pinion, gear and sprocket chain |
| (6) Gilbert screens | 40 | Gear and pinion, gear and sprocket chain |
| (2) Sand washing boxes | 15 | Gear and sprocket chain |
| (2) Sand washing boxes | 15 | Gear and sprocket chain |
| 8-in. Gould pump | 125 | Falk |
| 8-in. Gould pump | 125 | Falk |
| 8-in. Gould pump | 125 | Falk |
| 2-in. Economy | 3 | Direct |

*Head house on the dock showing the shuttle conveyor for boat loading*

The plant was designed by the Stephens-Adamson Manufacturing Co., Aurora, Ill., in conjunction with Paul Ales, general manager of the plant. Most of the major equipment in the plant was supplied by the Stephens-Adamson company and includes, besides that already mentioned, the Simplex carriers and 3-roll idlers for all the conveyors, the gravity takeups, the sand washers, Gilbert screens, and the 7- and 8-ply Ajax-Hewitt gutta percha conveyor belting used on the conveyors. Electric motors for the different equipment are of Allis-Chalmers make, excepting the Westinghouse 125-hp. motor for one of the Symons crushers. All of the large motors are equipped with solenoid brakes and Cutler-Hammer magnetic clutches. All the speed reducers in the plant are of Jones make. The 300-D type used with the Nos. 1, 3 and 5 conveyors employs a herringbone-Maag gear drive and



*Interior of the pump house showing the centrifugal pumps and their motors*

*Discharge from all three pumps converge to a common water line for the washing plant*

*Some sand is shipped by truck; the unloader is reclaiming this material from ground storage*

*One of the 12-wheeled motor trucks fording the river between the plant and the highway*

Timken roller bearings throughout. This is the first installation of these units in the rock products industry. The Jones reducer on the shuttle conveyor and pan feeder are of the spur gear, self-lubricating type. The No. 2 conveyor has a Jones No. 21 double spur gear reducer. All the motors, high speed couplings, solenoid brakes and gear drives were mounted on a unit semi-steel machined base to protect against any danger of misalignment which might occur if mounted on the structural steel only. Crane valves and fittings were used on practically all the water lines.

Concrete work such as abutments and piers for the railroad trestles, foundations for machinery and structural steel, material tunnels, stockpile partitions and the loading dock, was designed by the Maritime Engineering Co. Actual concrete construction, placing of steel and machinery erection was done by the Materials Service Corp. employes under the supervision of Paul Ales.

The plant was specifically designed to supply the Chicago territory, shipments to be made by the new boat *Material Service*. This boat is of special design to pass under the Chicago bridges. Loading at the plant is at about 1000 tons per hour and this is discharged at the Material Service Corp.'s south side or north side distributing yards

*The motorship "Material Service"*

at about 500 tons per hour. The boat makes a round trip between Lockport and Chicago in about 20 hours.

Under the present dual system of operation 6000 tons per 10-hour day is produced. This can be decreased by simply operating one unit, or increased by extending the working day. The flexibility of operation is apparent; in case one unit of the plant is down, the other unit may be operated double time to make up for loss of production. Thus the plant already has 100% increased capacity (figuring on a 10-hour-day basis) on hand without the necessity of installing additional equipment. Also, if necessary, the equipment can be speeded up to exceed the regular 10-hour daily production. Another noteworthy feature is that the flow of materials through each unit is not rigidly fixed so that it must go to the secondary crusher, screen, etc., in that unit, but can go to similar equipment in the other unit and without any unnecessary delay.

The Material Service Corp. owns and operates, in addition to its Lockport plant, a 3000-cu. yd. per day plant at Carpenterville, Ill.; Peoples Crushed Stone Co., La Grange, Ill., with a capacity of 1800 tons per day, and the new 2000-ton per day silica sand plant of the Ottawa Sands Corp., at Ottawa, Ill. The output of several other plants in these districts is also marketed by the company, which has 10 distributing yards in the Chicago territory.

Henry Crown is president and general manager of the company; Irving Crown, treasurer and vice-president in charge of operations; G. W. Lenzie, general superintendent. Paul Ales is general manager of the Lockport plant and F. W. Herkel is superintendent.

*Loading material out to barges docked alongside the head house. The aggregate batching bins show at the left*

*General view of the Calavera Rock Co.'s operation near Oceanside, Calif. The conveyor carries rock from the track hopper to the screening plant*

# Interesting Side-Hill Quarry Operation

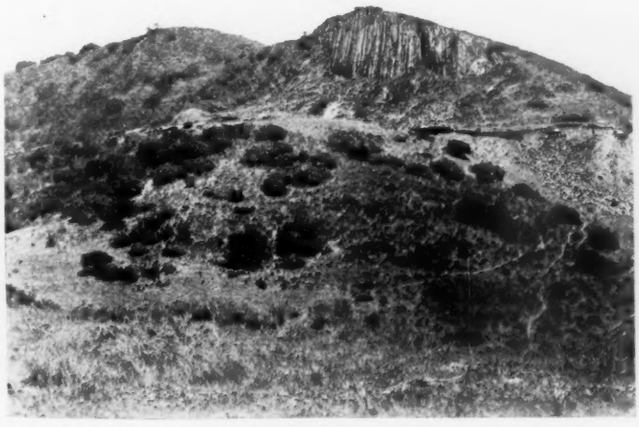
## Calavera Rock Co. Has a Modern Plant to Work the Lava Rock Deposit Near Oceanside, California

THERE IS a great pinnacle of volcanic rock about two-thirds of the way from Los Angeles to San Diego, Calif., that was a famous landmark in the days when people travelled by landmarks instead of following a ribbon of concrete. It was called Mount Calavera, Skull Mountain, and the name was not given because of its being a modern Golgotha or an ancient battle ground, but because the boulders that rolled down the talus resembled skulls to the imaginative Indian mind, their roundness being coupled with a conchoidal fracture. It is said to be the only deposit of hard rock on that portion of the old Camino Real, the mission-built highway that connects the two cities, and this may be so as the cuttings made where the highway passes through the hills shows nothing harder than the soft gray sandstone which the mission builders used so freely for sills, lintels and columns in construction work.

The rock, and other lava flows from the same source in the vicinity, has been worked for years by small crushers, but in November, 1928, a thoroughly modern plant was put into production by the Calavera Rock Co. The plant is situated within trucking distance of a number of fair sized and growing towns so that a market was waiting for its product. When the writer visited it, it was working three shifts a day and very little rock remained in the stockpiles.

### *Simple Quarrying Practice*

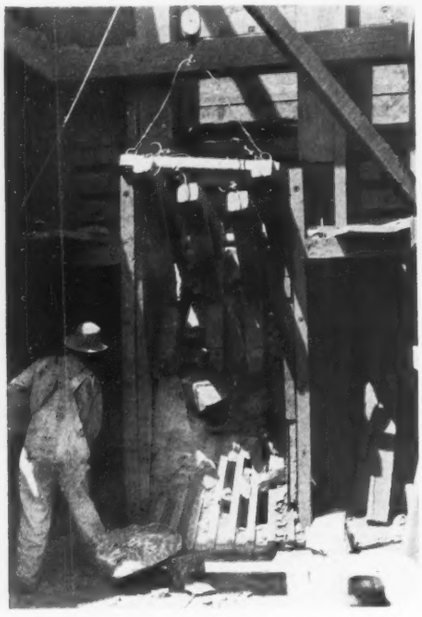
As in working many lava rocks, the quarrying problem is simple, as such rocks are already broken by the cooling stresses into the columns that give it its characteristic



*The lava pinnacle called Mount Calavera, as seen from the highway*

*Rock structure is such that a shovel can dig it without previous blasting*

appearance. Moderate charges of powder placed in the base of such a lava cliff are sufficient to bring down a lot of it, broken to a size that a steam shovel can handle readily. But at the Calavera quarry even this has not been necessary for some months past, the structure being such that the shovel can attack the face directly. The face is kept low, of course, and the purpose of the work is as much to clear off a good sized area at the track level as it is to recover



***Finger chute gate and grizzly to take out the dirt***

the stone. When the area has been cleared the pinnacle, which rises about 150 ft. above the track level, will be blasted with coyote holes in the regular Western fashion to bring down enough rock in a single shot to keep the plant busy for months.

The present quarry face is 1100 ft. from the track hopper and perhaps 150 ft. above the top of the screening plant. The problem to be met in designing such a plant is that of bringing the material down hill over a very rough bit of country and it has been solved at this plant as it was solved by the New York Trap Rock Corp. and some other large Eastern companies who have built plants in similar locations in recent years. That is, the rock is brought in to a primary crusher placed just below the quarry

***Gyratory crusher at the intersection of the belt conveyors***

level and broken to a size that can be carried on a conveyor belt, and then sent through two belts with a crusher at the intersection to the final screening and recrushing plant. The distance covered by the two belts from the track hopper to the screening plant is 550 ft.

The quarry shovel is a No. 105 Northwest with a 1-yd. bucket, powered with Twin City gas engines. It loads into 4-yd. side dump "Western" cars which are pulled into the hopper by a 7-ton Plymouth locomotive which has a Buda gas engine. Three cars are usually handled as a train. The track is of 30-in. gage and is kept in excellent condition, rather better than quarry tracks are usually kept.

Above the 14- by 30-ft. track hopper which receives the rock from the cars is a heavy grizzly, spaced 14 in., and any rock that cannot pass this must be sledged. This is to adapt them to the primary crusher which is a 14- by 38-in. "Roller-Bear," made by the Alloy Steel and Metals Co., of Los Angeles. The crusher is fed through a finger gate of a type that has been brought into the quarry industry from the mining industry, but before going to the crusher the rock passes over a 2½-in. to 3-in. grizzly which takes out all the dirt that comes from the surface and the cracks in the deposit. There is some loss in fines at this point but

***Dirt belt (upper) and conveyor to plant under the primary crusher***

it can be afforded as the oversize of the grizzly is of unusually clean lumps. The undersize is lifted by a short inclined conveyor to a hopper that loads into a car which is pushed by hand to a waste dump.

The crusher discharge falls into a hopper from which the rock flows out on to a 20-in. conveyor 250 ft. long. There is no mechanical feeder and none is needed, although the conveyor runs downhill. The downward inclination is about 7 deg. The belt is driven by a 5-hp. Sterling motor (made in Los Angeles) and the motor does all the braking that is required, although the belt would tend to run away if the motor did not hold it to its proper speed.

This 250-ft. belt discharges into a chute and box over a 12-in. Traylor gyra-

***The screening and recrushing plant***

tory crusher of the "Bull Dog" type, the box serving as a feeder. The discharge of the crusher falls into a hopper which feeds on to a 20-in. belt 200 ft. long which carries the rock, now ready for screening, to the upper part of the screening plant.

These conveyors were built by the Conveyor Co. of Los Angeles, which did all the engineering for the plant. Both conveyors are carried on steel trestles, and the trestle for the lower belt was a piece of engineering in itself, as it is supported on steel bents 70 ft. high. The belts have three troughing idlers but they are not in line, the center idler, wider than the others, being set behind the inclined idlers.

### *Screening*

The discharge of the 200-ft. belt goes into a 48-in. by 14-ft. trunnion screen which was built to order for this plant. It has 1¼-in. holes in the jacket and 2½-in. and 3½-in. holes in the main section. The oversize goes by a chute to a bin from which it is taken by an inclined conveyor, running across the face of the plant, to a 36-in. Symons cone crusher. After crushing it is returned to the same screen by a 12-in. bucket and belt elevator of the close connected type. The undersize of the 1½-in. holes goes to a Simplicity vibrating screen with a ½-in. and 3/16-in. openings. The products made by both screens are: No. 1, 2½- to 3½-in.; No. 2, 1¼- to 2½-in.; No. 3, ½- to 1¼-in.; No. 4, 3/16-in.- to ½-in.; No. 5, less than 3/16-in.

All products except No. 5 are sold for the usual crushed stone uses, especially concrete aggregate and road material, but No. 5 is used as raw material in making tile and drain pipe in some of the ceramic plants in the Los Angeles district, a rather unusual market for a crushed stone product.

Except for the Sterling motors used on the belts, and one other, the motors in the plant are of General Electric make. The drive of the primary jaw crusher is rather unusual as each flywheel is belted to a motor. One motor is of 28 hp., the other of 30 hp. The double belting has been found to give the crusher a greater capacity and there is no belt slip as there was when only a single motor was used. The 12-in. Traylor gyratory is powered with a 50-hp. Westinghouse motor.

*Looking down at the conveyors from the track hopper*

The entire product is delivered by truck, as is more often than not the case with plants in Southern California. Trucking is by contract and every truck and trailer that goes out carries a 20-ton load.

The rock is sometimes called basalt locally but it is really felsite, as its specific gravity, 2.56, shows. Lee Walker, manager of the company, says it has been classified as andesitic lava, which would indicate that feldspathic materials predominated in its composition. It has a good cementing value and makes an excellent macadam road metal as well as a good concrete aggregate. There is a growing demand for good macadam road material to be used in roads where the density of traffic does not justify the higher priced road slab.

The plant is situated about five miles from Oceanside, Calif., and about a mile from the Vista highway. The Los Angeles office is in the Washington building. T. F. Collins is president of the company.

*Side view of the track hopper and dirt belt loading waste into car*

## Many State Financing Highway Programs by Bond Issues

THAT BOND issues are of growing importance in highway financing is indicated by a survey of sentiment in various states. Texas heads the list of states which propose to vote on bond issues this year with a projected issue of $225,000,000. Oklahoma hopes to secure from $100,000,000 to $150,000,000 for its state road program. Georgia is pushing a $75,000,000 issue, Iowa again will attempt to secure $100,000,000. Iowa passed such a bond issue last year, but the bonding act was declared unconstitutional, although the ruling made plain there was no objection to the road bonding idea.

In the 1928 elections, Missouri secured by popular vote $75,000,000 in road bonds, Louisiana secured $30,000,000 and West Virginia $35,000,000. The 1929 legislatures gave Maine $15,000,000 in road bonds, New Hampshire $8,000,000, South Carolina $65,000,000. The latter state expects to complete her state highway system within 3½ to 4 years, building some 2,000 mile of hard-surfaced roads and improving 1500 miles.

Thirty-one states which have resorted to bonding to put through the state highway programs are 100% more advanced in their highway construction than the 17 states which are operating on the pay-as-you-go plan, in the opinion of highway experts. The United States Bureau of Public Roads estimates that $1,315,000,000 will be spent in road building this year, a similar figure to the estimate for 1928, although actual expenditures last year ran much higher.

Highway bonding by counties has been adopted by every state but North Dakota.

# Effect of Varying Crushed Stone Grading on Concrete

## Inclusion of Intermediate Sizes Has Little Effect on Properties of Concrete—Voids But Slightly Increased

IN THE *Crushed Stone Journal* for April, A. T. Goldbeck, director of the bureau of engineering of the National Crushed Stone Association, reports on tests made to show the effect of varying the grading of crushed stone when it is used as coarse aggregate in making concrete. This is part of the series which began with the effect of grading on the percentage of voids, published in the *Journal* last November and reported by Mr. Goldbeck at the annual meeting of the association. In this it was shown that the lowest percentage of voids, in a loose condition, (38%) was given by a mixture of 50% of the fine size (⅛ in. to ⅜ in.) and 50% of the coarse size (1½ in. to 2 in.). The lowest percentage in the rodded state (33.9%) was given by a mixture of 40% of the fine and 60% of the coarse.

It was also shown that while mixtures without the intermediate size (¾ in. to 1½ in.) gave the *lowest* voids, the effect of adding the intermediate size up to 30% and even 40% did not increase the voids more than 2% to 2½%. This finding has become of the highest importance to producers, for, following a recommendation of the Bureau of Public Roads, the present tendency of highway engineers is to combine separated sizes so as to produce the minimum of voids. If this recommendation were to be strictly followed it would be necessary for producers to dispose of intermediate sizes at a loss. But where a variation of 2% or so in the voids is admissible the intermediate size may be included (as is shown in one of the tests) up to the amount that is ordinarily found in the crusher run.

The new series of tests shows that the effect on the strength and other properties of concrete of including the intermediate sizes is hardly more than upon the percentage of voids. The cement requirement varies from 6 to 6.13 bags per cubic yard and the water-cement ratio is fairly constant. The variations in compressive and transverse strength are no more than might be found in concrete made of aggregate of identical grading tested under supposedly uniform conditions. They are:

| | Compressive strength | Modulus of rupture |
|---|---|---|
| High value | 4300 lb. | 785 lb. |
| Low value | 3910 lb. | 691 lb. |
| Ratio, high to low | 1.10 | 1.14 |

The table showing the strengths and other properties of the concrete is reproduced here (Table II) and also that showing the gradings and voids of the coarse aggregates (Table I). The paper notes that if these are compared it will be seen that neither the highest compressive strength (No. 7) nor the highest modulus of rupture (No. 10) was given by the grading with the lowest percentage of voids (No. 8). The strength results and voids have been plotted on a tri-axial diagram (Fig. 1 reproduced here), and in discussing this diagram the paper notes that :"Apparently the mixtures 3, 8, and 11, which are the mixtures containing no intermediate size material, are those having the lowest compressive strengths although high transverse strength. Apparently the mixtures lying in the zone of the highest compressive strength have 20% to 30% of (medium) ½-in. to 1¼-in. fragments and from 20% to 30% of (fine) No. 4 to ½-in. fragments." It is also noted that: "The highest value for modulus of rupture is not obtained with the mixture that gives the highest compressive resistance. The best all-around results seem to occur in aggregates Nos. 6, 7, and 9. Of these No. 7 (which has 20% of the medium) has the lowest cement factor and likewise good workability."

### *Indications and Conclusions*

The paper considers the results too meager to be conclusive but it says that they indicate:

"That a considerable percentage of intermediate size material may be used in coarse aggregate without increasing the percentage of voids more than a few per cent and without appreciably altering the cement factor of concrete strength."

The conclusions of the paper, quoted verbatim and in full, are:

"In conclusion it is pointed out that from the standpoint of stone production, it is undesirable that any gradation be specified which results in a waste of material, such as would occur in many cases if the so-called 'gap' grading, as typified by gradings Nos. 3, 8 and 11, is used. Such gradations would necessitate the screening out of ½-in to 1½-in (square mesh) material and the storage of this size until disposal. Fortunately, the test results show that this needless expense is unnecessary.

"Very roughly, the run of the crusher coincides with gradation No. 1, with variations depending upon the characteristics of the rock. Obviously a specification requiring approximately such a gradation

TABLE I—GRADATIONS USED

| | *Per cent* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 2 —1¼ | 42 | 40 | 60 | 20 | 30 | 40 | 50 | 70 | 50 | 60 | 80 | 70 |
| 1¼— ½ | 41 | 20 | 0 | 50 | 40 | 30 | 20 | 0 | 30 | 20 | 0 | 20 |
| ½—No. 4 | 17 | 40 | 40 | 30 | 30 | 30 | 30 | 30 | 20 | 20 | 20 | 10 |
| | *Weight in Pounds per Cubic Foot (loose volume)* | | | | | | | | | | | |
| | 96.6 | 96.9 | 98.6 | 94.8 | 95.9 | 96.5 | 98.2 | 99.2 | 96.4 | 97.2 | 97.9 | 95.9 |
| | *Per cent Voids* | | | | | | | | | | | |
| | 43.7 | 43.6 | 42.6 | 44.7 | 44.2 | 43.8 | 42.8 | 42.3 | 43.8 | 43.4 | 43.0 | 44.2 |

TABLE II—PROPERTIES OF CONCRETE[1]

| No. | Total Water | Wt. per Cu. Ft. | Flow | Workability | Water cement[2] | Bags of cement per Cu. Yd. | Combined Fineness Modulus | Crushing Strength | Modulus of Rupture |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 13.1 | 154.5 | 159 | 3 | 0.63 | 6.13 | 5.57 | 4090 | 701 |
| 2 | 14.3 | 154.1 | 161 | 2—3 | 0.69 | 6.05 | 5.45 | 4010 | 691 |
| 3 | 13.7 | 154.3 | 163 | 2+ | 0.66 | 6.03 | 5.58 | 4000 | 733 |
| 4 | 14.1 | 153.7 | 162 | 2 | 0.68 | 6.11 | 5.36 | 4060 | 758 |
| 5 | 14.1 | 153.6 | 163 | 2 | 0.68 | 6.07 | 5.43 | 4110 | 724 |
| 6 | 13.8 | 154.2 | 166 | 2 | 0.66 | 6.09 | 5.50 | 4170 | 767 |
| 7 | 13.9 | 153.7 | 168 | 2 | 0.67 | 6.01 | 5.55 | 4300 | 745 |
| 8 | 13.8 | 153.9 | 172 | 2+ | 0.66 | 6.00 | 5.69 | 3910 | 763 |
| 9 | 13.8 | 154.9 | 169 | 2+ | 0.66 | 6.12 | 5.60 | 4180 | 774 |
| 10 | 13.6 | 154.7 | 163 | 2+ | 0.65 | 6.09 | 5.66 | 4010 | 785 |
| 11 | 13.4 | 154.5 | 174 | 2—3 | 0.64 | 6.06 | 5.79 | 3970 | 724 |
| 12 | 13.2 | 154.5 | 167 | 3 | 0.63 | 6.13 | 5.78 | 4010 | 725 |

[1] Coarse Aggregate: Limestone No. 35, Sp. Gr. 2.75, 3.3% wear, Sand, Massponax No. 48

[2] W/C—Water cement ratio, i. e; ratio of volume of water to volume of cement.

would result in economy in stone production and the test results indicate that merely by a slight departure from the straight-line gradation, through the omission of a comparatively small amount of the intermediate size, very favorable concrete results are obtained. Gradations Nos. 9 and 10 illustrate the above point.

"One of the important features of all concrete construction and especially so of concrete road construction, is uniformity from batch to batch. It is desirable that the gradation of the coarse aggregate be kept fairly uniform, because of its effect on the workability of the concrete, on the water cement and on the cement factor.

"My message to the engineer who is contemplating requiring the shipment of aggregate in separated sizes, is that there are other things to consider than the academic requirement of gradation to obtain the minimum percentage of voids. One of these considerations is economy in coarse aggregate production. The production of aggregate having the minimum percentage of voids results in the discarding of intermediate size material. This is uneconomical, and, moreover, a gradation permitting the use of the intermediate size has an almost negligible effect on the percentage of voids in the coarse aggregate and on the strength values of the resulting concrete. Apparently then, the practical results desired, namely, high concrete strengths and economical concrete, may be obtained without the necessity of uneconomical stone production which would occur were it necessary for the producer to screen out, and store up until disposed of, a large quantity of intermediate size stone.

"To the stone producer, let me point out the desire of the engineer to produce uniform concrete and in this the producer may aid materially by taking all the necessary precautions to supply crushed stone having as uniform a gradation as possible during the entire course of the construction work."

The method of testing is given in detail in the original paper. A mix of 1:2:3½ was used and one 6 x 6 x 36-in. beam and two 6 x 12-in. cylinders were made for each gradation on each of three days. Massaponax (Fredericksburg, Va.) sand with a fineness modulus of 3.2 was the fine aggregate. Measurements were by dry, loose volumes and workability was kept constant by testing on a flow table. Screens with square openings of No. 4, ½ in., 1¼ in. and 2 in. were used in grading in the place of the ⅛-in., ¾-in., 1½-in. and 2½-in. round openings that were used in the tests on the percentage of voids.

(To correlate the results of this test with that of previous investigations, it seems worth noting that the gradings chosen were such that the fineness moduli of the combined aggregate were as little affected as the percentage of voids, the range being from 5.45 to 5.82 (about). Hence the concrete making properties of the aggregates, dependent on voids and fineness modulus, since the sand and stone were alike in all tests, were nearly identical for all the gradings. Hence the uniformity of the results, so far as water-cement ratio and compressive strength are concerned, might have been predicted.

The great value of these tests is that they come at the present time when the desire of some engineers to try out every new idea to the limit has caused some engineers to follow the Bureau of Public Roads recommendation to the border of absurdity. Specifications demanding mixtures of fine and coarse, with no intermediate size, have recently been given to producers.—Editor.)

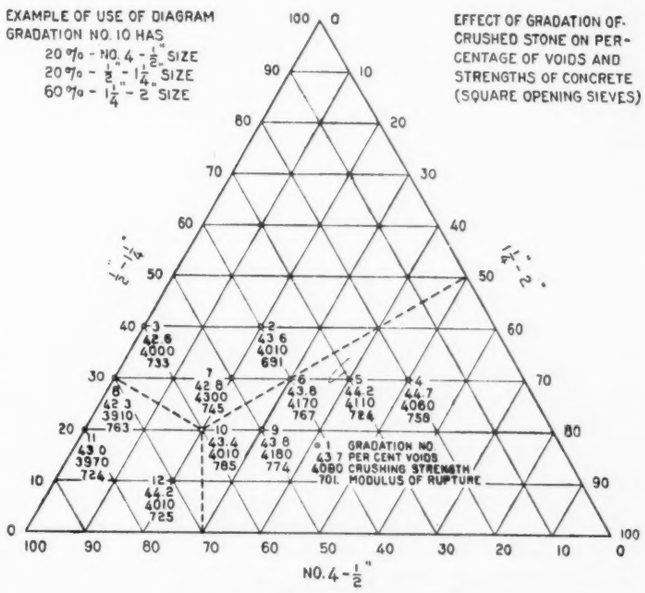

EXAMPLE OF USE OF DIAGRAM
GRADATION NO. 10 HAS
20 % - NO. 4 - ½" SIZE
20 % - ½" - 1½" SIZE
60 % - 1¼" - 2" SIZE
EFFECT OF GRADATION OF CRUSHED STONE ON PERCENTAGE OF VOIDS AND STRENGTHS OF CONCRETE (SQUARE OPENING SIEVES)
GRADATION NO.
43.7 PER CENT VOIDS
4080 CRUSHING STRENGTH
701. MODULUS OF RUPTURE
NO. 4 - ½"

***Fig. 1. Effect of gradation of crushed stone on percentage of voids and strengths of concrete***

## Design and Control of Concrete Mixtures

SIMPLE practical methods for producing concrete of definite quality to meet a wide range of requirements is given in the latest revised edition of the book, "Design and Control of Concrete Mixtures," published by the Portland Cement Association, Chicago. No involved calculations are necessary for satisfactory results.

In this edition a specification for concrete based on the 1928 building code regulations of the American Concrete Institute is included. The book also gives the A. S. T. M. tests used in the field to control concrete and shows how to obtain high-early-strength concrete and watertight concrete with standard portland cement.

## Mineral Industries of Vermont

THE ANNUAL report of the Vermont state geologist contains several interesting chapters for rock products operators. There is an excellent account of the geology of several sections of the state; a comprehensive report of the kaolins in the in Bennington area and a non-technical discussion of the various parts of rocks found in the state. Besides other reports there is given a brief survey of the present mineral resources.

## Concrete Mixes Using More Coarse Aggregate Under Test

A CONCRETE TEST pavement about one-half mile long, made up of slabs 9 ft. square and 7 in. thick, is being constructed at the Arlington experiment station of the United States Department of Agriculture by the Bureau of Public Roads. When tests are made engineers of the bureau hope they will show that the prevailing mixtures used in making concrete for roads may be modified by the use of a larger proportion of coarse aggregate such as gravel, slag or crushed stone, so as to effect a substantial saving in cost and at the same time increase the strength and durability of the concrete.

The prevailing mixture for concrete pavements is one part cement to two parts of sand and 3½ parts of crushed stone or gravel. Engineers believe that, if it is possible to secure as good or better concrete when the proportion of broken stone or gravel is increased to 4½ parts, a saving of about $1000 per mile in the cost of concrete roads will be effected.

The test road is being built just as an ordinary concrete road would be constructed except that the mixture for each slab will contain a different kind or amount of coarse aggregate and a different quantity of water.

After curing, the slabs will be drilled for cores and subdivided into beams suitable for flexure or bending tests.

Supplementary tests will also be made on beams and cylinders cast at the time the pavement slab is placed, which will show the relationship between the strength of molded specimens and that of specimens cut from pavement slabs.

# Milwaukee's Municipal Quarry*

## Some Interesting Cost Figures

By P. M. Johanning
Mechanical Engineer, Department of Public Works, Milwaukee, Wis.

A MUNICIPAL STONE QUARRY has been operated by the city of Milwaukee since 1923. During the six years, including 1928, 202,332½ cu. yd. of crushed stone has been produced and delivered at an average cost of $1.72 per cu. yd.

No doubt a large number of operators of quarries believe that the city should not be interested in quarrying, and that this should be a private enterprise operated for profit; or that the city is competing with private enterprises. It is doubtful that the principal reason for starting a quarry was financial gain or economy; possibly some expected such results. There were other considerations involved in the matter.

### Reasons for Establishing the Quarry

The Central Board of Purchases is organized according to the Wisconsin state law and operates accordingly, getting the lowest prices. It found, by experience, that crushed stone could be purchased cheapest in the early spring, and bids were taken and contracts awarded accordingly. These bids were on the year's requirements. The vendors naturally quoted their lowest prices in order that they might get this business. The low bidder was given a contract. As the season progressed, contractors began to require large amounts of stone on short notice and were willing to pay a premium, which the city could not do. Consequently, the city got the surplus and in times of shortage got nothing, and therefore the city work suffered, and in a great number of cases delivery was neglected. This should not be considered as a criticism of the Central Board of Purchases, but is a condition resulting from the natural laws of supply and demand.

By operating its own quarry, the city can produce stone and utilize it to the best advantage. There is no need of a stockpile or a surplus, or waste, of a certain size. There is no rehandling; poor stone can be utilized in places where poor stone fulfills the requirements. Stone can be selected that is to advantage. As a result of these advantages the city's quarry operates each working day during the year when the weather is not too severe. Of the 305 working days in 1928, crushed stone was produced on 252 days, 19 days were lost on account of making changes in the plant and 34 were lost on account of weather conditions.

The stone quarry is located on property owned by Milwaukee county. This land was originally purchased for an airport, but has been transformed into, and is being used as, a park and public golf course. The city pays the county a royalty of 10 c. per cu. yd. for each yard of crushed stone.

The funds for operating the quarry are set up as a rotary fund at the beginning of each year, but this amount must be returned to the general city fund at the end of each year. All costs of producing and delivering stone, and all expense considered necessary for operating, are charged against this fund.

In the case of selling stone from this quarry it is merely a transfer to other city departments. The county receives a small amount of this stone for use in the park in which the quarry is located, and for repairs of the nearby highways.

### Editor's Warning!

***DON'T THINK** for a minute, because we reprint this article, that ROCK PRODUCTS has changed in life-time opposition to municipal- and government-operated quarries and gravel pits! The fact that it is admitted here to have cost the city of Milwaukee $2.05 per cu. yd. to make its own crushed stone—under the most favorable conditions—with no taxes included—is the answer to that. In other words, this article is in itself a good argument against such government and municipal quarries for reasons of economy, because instead of saving an imaginary sum the city has really lost income from taxes and other sources.*

*There are some things in this article, however, that every crushed-stone and gravel producer should take cognizance of, and that is Mr. Johanning's criticism of the service of commercial producers. This may be entirely unjustified, but it probably contains enough truth to furnish a plausible reason for many a municipal and county aggregate-producing operation. All readers will find the cost analysis interesting.—The Editor.*

### Production

The city has produced and delivered crushed stone at a cost as follows:

| | Cubic Yards | Cost |
|---|---|---|
| 1923 | 11,168 | $ 15,691.89 |
| 1924 | 24,218 | 52,002.09 |
| 1925 | 28,263½ | 42.860.77 |
| 1926 | 26,685 | 49,373.40 |
| 1927 | 47,953 | 76,900.95 |
| 1928 | 64,045 | 111,109.82 |
| Total for six years | 202,332½ | $347,938.92 |

The average cost has been $1.72 per yd. for the six years. The average cost per yard was increased in 1928 over the previous yard by ½ c. per yd., due to an unjust stripping charge of 29½ c. per yd., which should be distributed.

The above figures do not include interest, depreciation, tax or overhead. These items, if definite statements were made, would cause argument which could never be settled. The city pays the county a royalty, therefore it would be unfair to consider interest, depletion or tax on the real estate. The city when borrowing money pays less than 4¼% interest. The amounts invested during 1923-28 were:

| | | |
|---|---|---|
| 1923 | $18,664.28 | for 5 years |
| 1924 | 37,428.82 | for 4 years |
| 1925 | 8,336.66 | for 3 years |
| 1926 | 24,680.03 | for 2 years |
| 1927 | 14,524.56 | for 1 year |
| 1928 | 3,101.24 | |

At 4¼%, the interest amounts to $14,-107.08, or about 6.97 c. per yd.

If a depreciation of 10% is assumed on all machinery and buildings and all improvements, this amounts to $32,166.48, or 15.9 c. per yd.

All maintenance charges and insurance and royalty are included in the cost of operation.

Services rendered to the quarry by other city employes which are not charged direct to the quarry have been estimated by some unfavorable to the proposition as $20,296 for six years, or 10 c. per yd.

The total of the above four items—cost of operation, interest, depreciation and services rendered—is $2.05 per cu. yd.

### Effect on Local Market

A price has been set at $2.25, which is charged to the various departments per cubic yard of stone delivered. This price was determined from the market quotations and was found to be an average price. Accordingly, a net saving of $40,466.50 has been produced in six years. To express this differently—10% more stone was used to improve 10% more streets without additional cost.

No mention has been made of the effect of this proposition on the local market. The stone produced in the city's quarry is used only for work done by city departments. Contractors purchase stone from privately owned quarries for all contract work. Much more stone is used on contract work than by city departments.

A larger amount of stone was produced in 1928 because of better operating conditions. Operations in 1928 show a 33⅓% increase in production over 1927.

*From *The American City*, April, 1929.

# What May the German Lime Industry Learn from America About Rationalization?*

ACCORDING to Paul Ludowigs, director of the Rheinischen Kalkindustrie, Wuelfrath, Germany, who spoke on this subject at the principal meeting of the Society of German Lime Manufacturers in Berlin on February 22, 1929, the technical advances in the winning of the raw materials in open workings have been developed to a high perfection in the German mining of brown coal, in the cement industry, in the open working of ore and in the anhydrite works of the I. G. Dye Industry at Niedersachswerfen. In abstract Mr. Ludowigs said:

There is no need to be ashamed of the success of the German lime industry in its rationalization when the conditions in the other European countries are compared. Only the bagged lime industry in Belgium and France show a few progressive examples, but in these countries also the mechanization of the winning of raw material is still in its infancy.

When may one suitably change over to the mechanical mining of limestone? (1) When there are not sufficient or no suitable working forces available. (2) When the marketable products must be prepared by the plant or classified by sizes. (3) When there is sufficient sale, especially of the small sized material.

The German lime industry has carried out since the war a few outstanding examples of mechanization of its plants; at that time the advances attained already in America were not yet known. Thus, America surpasses at the present in many respects the German lime industry. The reason for this is to be explained principally in the shortage of labor and the high wages in America, which compelled early mechanization; it was easier to raise the capital for the alterations. Besides this, the increase in sales in America is to be considered. Lime hydrate is used in concrete contruction and crushed limestone serves for railroad ballast and for street construction. The railroad companies assist the limestone plants also; they place 50-ton automatic car-unloaders at their disposal. Ships for carrying limestone of 10,000- to 12,000-ton capacity ply on the Great Lakes. These ships are so designed that they can be discharged in 8 hours. Experiences in operation are universally frankly exchanged. In America the greatest value is placed upon simple, non-complicated solutions of the technical problems. The designs come first of all from the plant engineer who knows the requirements of the works exactly. One does not leave it to the machinery factories to deal with these technical problems.

*From *Tonindustrie-Zeitung* (1929) 53, 28; pp. 543-545.

### *Quarry Operation Methods Observed*

In the American limestone quarries which were visited, the stripping is usually small. But where it is several meters thick, it is moved with a shovel exacavator. Drilling is usually done with a well drill, with which vertical holes of 15 cm. (6 in.) diameter are made up to a depth of 90 m. (295 ft.). In this manner as many as 160 holes are blasted simultaneously, and more than 400,000 tons of rock loosened in one blast. Either 40

***Paul Ludowigs (left) and H. Siemssen. This photo was taken at the time of Mr. Ludowigs' visit to the different rock products plants in this country; this interesting article being the result of his observations***

or 60% dynamite is used for explosive. In the drilling process described, the drilling crews are exposed less to danger of injury than in working on rock walls; furthermore, the cleaning of the cut wall to permit placing of the holes is eliminated. In spite of this the suitability of this process for Germany is questioned since the consumption of explosive is greater than in other blasting methods. Tunnel (coyote-hole) or chamber blasting is used less frequently; but then, several rooms side by side are blasted simultaneously, or larger tunnels with a row of chambers, so that even in this method several hundred thousand tons of rock can be won simultaneously. Compressed air drills for primary holing were found in only one of the 33 operations visited.

Loading is done mostly with a shovel excavator of up to 9-cu. m. (12-cu. yd.) dipper capacity. However, those of 3-cu. m. (4-cu. yd.) capacity appear to operate more economically.

Surprisingly, the repair costs are generally lower than in Germany; it remains to be said whether this is due to better experience in construction or to better material. The Ward-Leonard control customary in America, by which three-phase current is changed to direct current in the excavator, has been adapted also by the German machinery factories, since with it a saving in current and an easier and smoother handling of the excavator is made possible. The Rollock drive is also not unknown in the United States.

### *Quarry Haulage Observations*

The cars for hauling in America hold from 10 to 50 tons of limestone and 80 tons of ore. As with the excavators, breakers, etc., so with the cars the development is directed to choose constantly greater units. Some of the cars are discharged by a tipper, but usually the upper part of the car is tippable sideways. The tipping process is effected by electric winches or by a built-in, compressed-air cylinder. In this case the compressor is located upon the locomotive. The cars are built usually of wood and iron combined, since thereby the car receives greater elasticity to shocks and suddenly received loads, and repairs can be made quicker. The Rhinish Lime Works have of recent years changed over to 20-25 ton cars.

Besides the steam and electric locomotive the Woodford centrally controlled electric system is customary, in which every transporting car of 15 tons capacity has two motors of 35 hp. each and a selector switch. A third rail supplies the current. A switching station is located at a vantage point of the quarry, where one or two laborers charge the individual sections of the third rail with current. If now the laborer supplies 250-volt current to the rail section upon which the car to be set in motion is located, then the selector switch selects this current and the car starts in motion. If the car is to be stopped, the 250-volt current is cut out, and the 110-volt cut in. This current actuates the brakes so that the car stops at once. Each car of this design costs about $9000, but the operating force is reduced to the limit. Sometimes trucks of 10 tons useful load with tippable bodies are used in the quarry. Its advantages is the movability of the transport vehicle; but a level and clean kept quarry floor is prerequisite.

### *Plant Details Commented On*

The German machinery manufacturer frequently places value upon erecting loading apparatus at all possible places. Such cares

the American, generally, does not know. The large rock cars are frequently dumped in such rapid sequence into the dumping chute located above the crusher, that one can hardly recognize what kind of crusher is crushing the rock. Jaw breakers with a jaw width of up to 215x165 cm. (80 in. x 60 in.) are customary. The maximum volume is handled by a gyratory breaker in Rogers City, Mich., which crushes 2500 tons per hour. Roll crushers are not customary for the initial sizing due to the unfavorable power factor. The Titan breaker has been introduced into Germany with good results for the initial sizing of large blocks of rocks in lime works.

Rotary cylindrical screens are used in America for the screening; the rod screening grate used frequently in Europe is not known in America. The disadvantage of this grate is avoided in the grizzly or roller grate customary in America, the pecularity of which lies in that each successive roller rotates faster than the preceding one, so that clogging it is impossible. The vibrating screen is used in America for the small grained material. Its advantages are in the compact design, the low purchase price and the extraordinarily low power requirement of ¼ to 2 hp. This type of screen should be considered to a greater extent by the German machine factories.

### *Comments on Washing Stone*

The stone and screening washing plants in America are not to be copied. In Germany it was learned a long time ago that fine and coarse material must be washed together, whereby the fine material plays the part of a scouring medium. However, in America the stones are sized frequently before or during the washing. As a result they are covered with loam after washing.

It appears striking that in the machinery drives in America reduction gears are used to a far greater extent than here. This increases operating safety, time is saved and danger decreased. Pan conveyors are used mostly for conveying the stone, but rubber belt conveyors are much in use and surprise one because of their durability and outstanding output. In Germany we are not furnished such high grade rubber conveyor belting, even though it is to be recognized that the durability of German rubber conveying belts has increased exceptionally of late. The belts travel in America at speeds up to 150 m. (492 ft.) per minute. One such belt, which transported 15 million tons in a year, needed to be replaced but yearly.

### *On Lime Plants*

A storage plant is usually installed between the quarry and lime kiln. It is made of concrete frequently only in the foundation structure, with the upper part of wood. The bunker or bin gates are operated by compressed air. How seldom on the other hand does one see in Germany faultlessly functioning bunker gates!

The size and output ability of American lime kilns stands far behind that of the European plants. The largest American lime plant is said to produce in several works 700 tons of lime per working day, whereas several German companies exceed this figure considerably and produce in individual works more than 900 tons daily.

The ring kiln does not come under consideration in America for the burning of lime, since it demands too much hand labor and the lime comes in contact with the coal. Shaft or rotary kilns are preferred, which are operated with semi-gas firing or with generator gas or with natural gas. Even powdered coal is rejected for the rotary lime kiln, since it affects the color of the lime somewhat. The high sales prices for lime and the low fuel prices over there do not force producers to such economical operating and to such high outputs as here. In the utilization of heat and in the degree of efficiency, our kilns exceed those in America by far. However, in America one places an entirely different value upon the quality of the burned lime. In Germany, we must also occupy ourselves more earnestly with the problem whether the gas kiln does not surpass the mixed-feed kiln.

Each lime burning works in America is combined with a lime grinding and slaking plant, since the bagged lime has displaced the stucco lime because of its more simple application.

### *Larger Outputs per Man in America*

When it was pointed out previously that the American limestone industry is superior to the German because of its advances in rationalization, this applies to the stone quarry and the stone conditioning plant, since a superiority in the lime-burning process cannot be determined. Naturally there are great differences in the number of workmen, in the determination of which the quantity of stripping, the hardness and lay of the limestone and the problem of whether the limestone must be washed play decisive parts. On the average, from 12 American limestone works, the astounding output of 56 tons per shift was obtained per man. If the output per man, of 11 tons per shift, of our works is compared with this, one can see what remains to be done by us. However, in our works we must handle far greater quantities of stripping and must even obtain part of the rock by hand.

The high outputs combined with the small number of the crew result naturally in low operating costs. In a number of plants the operating costs amount not even to $3.33 per 10 tons. The operating costs are of course influenced by the figure for maintenance costs.

The Americans are masters in the distinct, easily visible arrangement of their plants, in the invention of simple solutions, in the selection of suitable machines and in the cutting out of points of trouble. We save frequently at the wrong end, forced by the financial conditions prevalent.

Forced by competition, many firms sometimes offer machines which cannot withstand rough service in the quarry. We act much more wrongly if we screw down the prices and believe thereby we have made good business for the plant. In the same class belongs the mania of many lime-plant owners to obtain used machinery. The small number of repair men in the American plants is an astounding proof that the repair requirements are considerably below ours. Reserve parts are hardly kept at all, since the machines are constructed so sturdily that repairs are few. The interruptions to operation, which are caused by repairs, are naturally also absent.

### *Labor and Wage Conditions Compared*

It is known that America exceeds by far the wage rates customary to us. But the rates must not be compared without understanding. The wages are very dissimilar in America, as well locally as in the manner of production of labor. It is incorrect to say that the rate of the American wages is conditioned by the cost of living. Rather, it is more accurate to say that the wage portion of the operating costs in America is far lower than with us, due to far-reaching mechanization, and due to better deposits of raw material; and because there is no competition with neighboring countries. Finally, the industry over there has to carry hardly any social burdens and much lower taxes. The only social obligation consists of compulsory accident insurance by the employer; but the payment of premiums is determined according to the rating which the individual plant has obtained during the preceding year. It is therefore in the interests of each to eliminate sources of danger.

Very impressive to every visitor who understands economy are the sympathetic relations between capital, plant management and owners of the plant which prevail over there. These give to the body of American industry its admirable energy, an energy which we lack entirely due to our interpolitical distraction. There cannot be any doubt that freedom from excessive social burdens is an important support in the development of American industry. Upon the basis of statistics from a few German lime plants the employers and employes here must pay annually $107 per capita of labor employed towards social burdens. The billions raised in this manner vanish to a large extent in the hands of the administration, whereas a saving and interest payment of these sums would after 35 years result in a capital of more than $14,290 for the individual, if he were spared from sickness and unemployment. With the freedom practiced in America not only the individual but also the entire public is served far better than by our present system, which undermines the joy of working.

# Editorial Comment

**Politics and The Tariff**

American portland cement manufacturers have spent many years and much money making "portland cement" commonplace words, understood everywhere. The man and woman on the street know what it is, how it is used, how it enters directly in the budgets for building their homes, and into the construction of most of the utilities and conveniences of modern life—highways, waterworks, sewage systems, etc., etc. By this education of the American public our cement industry has been enabled to constantly expand production, and at the same time to reduce costs and prices of cement. Only by keeping portland cement cheap and popular can present production and consumption be maintained, to say nothing of achieving the hope and aim of every portland cement manufacturer of still further expanding the market.

Unfortunately, during periods of tariff revision like the present, the popularity of a product becomes a distinct disadvantage to its manufacturers; certainly so, if, like portland cement, it happens to be on the "free list." For the tariff is ever a political issue in spite of the best efforts of enlightened statesmen to make it only an economic one. A political issue is something professional politicians are always ready to sieze upon to make personal political capital out of. All commodities on the tariff schedule do not furnish opportunities for such political capital. We do not hear of politicians decrying a proposed tariff on sisal or copra or some other commodity which neither they nor their constituents have knowledge or understanding of. Not so with portland cement. It is almost as good a subject to talk about and make political trades with as bread, the staff of life itself, would be, as a tariff issue.

So Middle West farmers are now being fed a lot of bunk about the certain or probable increases in the price to them of portland cement should there be a tariff on this commodity. Added to this is the always more or less successful attempt to play upon sectional prejudices—that only the East will benefit from the tariff, and that at the expense of the Mid-West farmers. Some of this bunk is spread about by local politicians who hope thus to gain the farmers' favor; but some is well-organized propaganda financed by foreign cement manufacturers and importers.

The contention that the depression of portland cement prices at Eastern seaports because of the competition from imports of cheap foreign cement, affects or can affect interior prices is too absurd to require refutation or argument to producers of rock products, who know that relatively short-haul railway rates govern competition in these commodities throughout this country. By the portland cement importers' own sworn statements they can not penetrate beyond trucking distance of the pier where their cement is landed.

That the portland cement industry needs a protective tariff no one who has read the briefs filed with the Ways and Means Committee of the United States House of Representatives and the Finance Committee of the United States Senate can doubt. That portland cement manufacturers have proved their case, so far as it is humanly possible to do so, no one who has read these briefs can seriously question. That the duty of 8c per 100 lb. or 30.4c per bbl. as proposed in House tariff bill is entirely inadequate can not be questioned if one concedes that any tariff at all is necessary. Yet we have a typical case here where even with facts and logic established there is real danger that the trading propensities of our politically local-minded statesmen may result in leaving portland cement on the free list, to the great detriment of a basic American industry and to the real injury of many other industries that depend upon the portland cement industry to buy their products, and to American labor, which can not and will not compete with European labor for a wage of 13c per hour.

The attitude of Congress in this case is a good example of what the actual government of this country can do and frequently does do to discourage American enterprise and prosperity: It penalizes an industry that makes its product popular; it allows the industry to pave the way for cheap foreign competition by promoting new markets with the expectation that it will be given the same protection as other American industries; it fails to consider the merits of the case, as judiciously determined; it allows political dickering and misrepresentation regardless of injury to a great industry, and it thereby invites business men to resort to the same kind of tactics as the only method left them of accomplishing something so vital to their welfare and to the welfare of the American people.

All our readers, it seems to us, as a mere matter of justice and understanding, should use their best efforts to clear the atmosphere of the bunk and specious arguments that are being broadcast in this case. There is no producer of rock products who is not familiar with the market conditions or economic factors which control the distribution and the price of standardized, basic, heavy, low-priced commodities like portland cement. For their own future safety as American citizens and business men they should combat all attempts by politicians or others to prejudice any part of our people by untruths and hokum. They have done much to promote honesty and fair and open dealing in business and industry. It is time we all made a little effort to encourage or promote similar methods in politics.

# Financial News and Comment

## RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

| Stock | Date | Bid | Asked | Dividend |
|---|---|---|---|---|
| Allentown P. C. 1st 6's[20] | 8-10-29 | 90 | ..... | |
| Alpha P. C. new com. | 8-12-29 | 44 | 46 | 75c qu. July 15 |
| Alpha P. C. pfd. | 8-12-29 | 116 | ..... | 1.75 June 15 |
| American Aggregates com.[20] | 8-10-29 | 40 | 44 | 75c qu. Mar. 1 |
| Amer. Aggregate 6's, bonds | 8-10-29 | 96 | 98½ | |
| American Brick Co., sand-lime brick | 8-10-29 | 16 | ..... | 25c qu. Feb. 1 |
| American Brick Co. pfd., sand-lime brick | 6-28-29 | ..... | 82 | 50c qu. Aug. 1 |
| Am. L. & S. 1st 7's[20] | 8-10-29 | 94 | 96 | |
| American Silica Corp. 6½'s[19] | 8-14-29 | 95 | 100 | |
| Arundel Corp. new com. | 8-13-29 | 41 | 41½ | 50c qu. July 1 |
| Atlantic Gyp. Prod. (1st 6's & 10 sh. com.)[10] | 8-14-29 | 75 | 89 | |
| Atlas P. C. com. | 8-12-29 | 47 | 49 | 50c qu. June 1 |
| Beaver P. C. 1st 7's[20] | 8-12-29 | 98 | 101 | |
| Bessemer L. & C. Class A[1] | 8- 9-29 | 33¼ | 35 | 75c qu. Aug. 1 |
| Bessemer L. & C. 1st 6½'s[4] | 8- 9-29 | 94 | 96 | |
| Bloomington Limestone 6's[20] | 8-10-29 | 88 | 92 | |
| Boston S. & G. new com.[16] | 8-12-29 | 20 | 23 | 40c qu. July 1 |
| Boston S. & G. new 7% pfd.[16] | 8-12-29 | 50 | 52 | 87½c qu. July 1 |
| Calaveras Cement 7% pfd. | 8-10-29 | 88½ | 89 | |
| Calaveras Cement com. | 8-10-29 | 18 | 19½ | |
| Canada Cement com. | 8-12-29 | 26¼ | 26½ | |
| Canada Cement pfd. | 8-12-29 | 97 | 98 | 1.62½ qu. June 29 |
| Canada Cement 5½'s[11] | 7-26-29 | 98½ | 99 | |
| Canada Cr. St. Corp. 1st 6½'s[32] | 8-10-29 | 96½ | 97 | |
| Canada Gyp. & Alabastine | 8-12-29 | 120½ | 121 | 75c qu. July 2 |
| Certainteed Prod. com. | 8-13-29 | 30 | 30½ | |
| Certainteed Prod. pfd. | 8-13-29 | 72 | 90 | 1.75 qu. Jan. 1 |
| Cleveland Quarries new st'k | 8-13-29 | 70 | ..... | 50c & 25c ex. Sep.1 |
| Columbia S. & G. pfd. | 8-12-29 | 86 | 91 | |
| Consol. Cement 1st 6½'s, A[42] | 7-31-29 | 90 | 92 | |
| Consol. Cement 6½% notes[24] | 8-14-29 | 85 | 90 | |
| Consol. Cement pfd.[20] | 8-10-29 | 50 | 60 | |
| Consol. Oka S. & G. 6½'s[12] (Canada) | 8-12-29 | 101 | 103 | |
| Consol. Rock Prods. com.[44] | 8-10-29 | 10½ | 11 | |
| Consol. Rock Prods. pfd.[44] | 8-10-29 | 23 | 25 | |
| Consol. Rock Prods. units[20] | 7-27-29 | 52 | 53 | |
| Consol. S. & G. com.(Can.)[45] | 8-13-29 | No market | | |
| Consol. S. & G. pfd. (Can.) | 8-13-29 | 92 | 92½ | 1.75 qu. Aug. 15 |
| Construction Mat. com. | 8-13-29 | 24 | 24⅞ | |
| Construction Mat. pfd. | 8-13-29 | 42 | 43 | 87½ c qu. Aug. 1 |
| Consumers Rock & Gravel, 1st Mtg. 6's, 1948[44] | 8-10-29 | 95 | 97 | |
| Coosa P. C. 1st 6's[20] | 8-10-29 | 50 | 55 | |
| Coplay Cem. Mfg. 1st 6's[40] | 8-14-29 | 90 | ..... | |
| Coplay Cem. Mfg. com.[40] | 8-14-29 | 10 | ..... | |
| Coplay Cem. Mfg. pfd.[40] | 8-14-29 | 70 | ..... | |
| Dewey P. C. 6's[30] (1930-41) | 8-14-29 | 97 | ..... | |
| Dewey P. C. 6's[30] (1942) | 8-14-29 | 101 | ..... | |
| Dolese & Shepard | 8-12-29 | 105 | 115 | $2 qu. July 1 |
| Edison P. C. com.[29] | 7-26-29 | 10c | ..... | |
| Edison P. C. pfd.[29] | 7-26-29 | 25c | ..... | |
| Giant P. C. com.[25] | 8-10-29 | 30 | 35 | |
| Giant P. C. pfd.[25] | 8-10-29 | 33 | 39 | 3½% s.-a. June 15 |
| Ideal Cement, new com. | 8-13-29 | 72 | 75 | 75c qu. July 1 |
| Ideal Cement 5's, 1943[33] | 8-10-29 | 99 | 101 | |
| Indiana Limestone units[29] (5 shs. com. & 1 sh. pfd.) | 8-10-29 | 100 | ..... | |
| Indiana Limestone 6's | 8-10-29 | 80⅞ | 83 | |
| International Cem. com. | 8-13-29 | 76 | 76¾ | $1 qu. June 28 |
| International Cem. bonds 5's | 8-13-29 | 102½ | 103 | Semi-ann. int. |
| Iron City S. & G. bonds 6's[46] | 8-10-29 | 92 | 95 | |
| Kelley Is. L. & T. new st'k | 8-13-29 | 50 | 55 | 62½c qu. July 1 |
| Ky. Cons. St. com. Voting Trust Certif.[48] | 8- 9-29 | 13 | 14 | |
| Ky. Cons. Stone 6½'s*[48] | 8- 9-29 | 96 | 100 | |
| Ky. Cons. Stone pfd.[48] | 8- 9-29 | 90 | 95 | |
| Ky. Cons. Stone com.[48] | 8- 9-29 | 13 | 14 | |
| Lawrence P. C. | 8-12-29 | 80 | 85 | 2% qu. June 29 |
| Lawrence P. C. 5½'s, 1942 | 8- 7-29 | 88 | 92 | |
| Lehigh P. C. | 8-12-29 | 46⅛ | 48 | 62½c qu. Aug. 1 |
| Lehigh P. C. pfd. | 8-12-29 | 108½ | 110 | 1¾% qu. Oct. 1 |
| Louisville Cement | 8-12-29 | 250 | ..... | |
| Lyman-Richey 1st 6's, 1932[13] | 8-10-29 | 97 | 99½ | |
| Lyman-Richey 1st 6's, 1935[13] | 8-10-29 | 96 | 98 | |
| Marblehead Lime 6's[14] | 8- 9-29 | 98 | 100 | |
| Material Service Corp. | 8-13-29 | 28½ | 30 | 50c qu. Sept. 1 |
| Medusa Portland Cem.[29] | 8-10-29 | 120 | 125 | 1.50 July 1 |
| Mich. L. & C. com.[6] | 7-26-29 | 35 | ..... | |
| Missouri P. C. | 8-13-29 | 42½ | 43 | 50c qu. Aug. 1 |
| Monolith Midwest[9] | 8-10-29 | 8½ | 10 | |
| Monolith bonds, 6's[9] | 8-10-29 | 97 | 98 | |
| Monolith P. C. com.[9] | 8-10-29 | 14 | 14½ | 40c s.-a. July 1 |
| Monolith P. C. pfd.[9] | 8-10-29 | 9 | 9½ | 40c s.-a. July 1 |
| Monolith P. C. units[9] | 8-10-29 | 32 | 33½ | |
| National Cem. (Can.) 1st 7's[29] | 8-10-29 | 96 | 99 | |
| National Gypsum A com. | 8-12-29 | 12 | 14 | |
| National Gypsum pfd. | 8-12-29 | 53 | 56 | |
| Nazareth Cem. com.[26] | 8-10-29 | 27 | 29 | |
| Nazareth Cem. pfd.[26] | 8-10-29 | 100 | 105 | |
| Newaygo P. C. 1st 6½'s[29] | 8-10-29 | 101 | 102 | |
| New Eng. Lime 1st 6's[14] | 8- 9-29 | 96 | 98 | |
| N. Y. Trap Rock 1st 6's | 8-10-29 | 97½ | ..... | |
| North Amer. Cem. 1st 6½'s | 8-13-29 | 73¼ | 73¾ | |
| North Amer. Cem. com. | 8- 9-29 | 8⅞ | ..... | |
| North Amer. Cem. 7% pfd.[22] | 7-12-29 | 32 | 42 | 1.75 qu. Aug. 1 |
| North Amer. Cem. units[20] | 8-10-29 | 39 | 44 | |
| North Shore Mat. 1st 5's[15] | 8-14-29 | 96 | ..... | |
| Northwestern States P. C.[37] | 7-26-29 | 140 | ..... | |
| Ohio River Sand com. | 8-12-29 | 28½ | 30 | |
| Ohio River Sand 7% pfd. | 8-12-29 | 101 | 103 | |
| Ohio River S. & G. 6's[16] | 8-12-29 | 92 | 94 | |
| Pac. Coast Agg. 6½'s | 7-27-29 | 99 | ..... | |
| Pac. Coast Agg. 7's | 7-27-29 | 99 | ..... | |
| Pac. Coast Cem. 6's, A[5] | 8-10-29 | ..... | 95 | |
| Pacific Lime Co. pfd.[11] | 8-12-29 | 60 | 70 | |
| Pacific P. C. com. | 8-10-29 | 22 | 25 | |
| Pacific P. C. pfd. | 8-10-29 | 80 | 83 | 1.62½ qu. July 5 |
| Pacific P. C. 6's[5] | 8-10-29 | 99¼ | 100 | |
| Peerless Egyp'n P. C. com.[21] | 8-12-29 | 2½ | 3½ | |
| Peerless Egyp'n P. C. pfd.[21] | 8-12-29 | 85 | 90 | 1.75 July 1 |
| Penn-Dixie Cem. 1st 6's | 8-13-29 | 85½ | ..... | |
| Penn-Dixie Cem. pfd. | 8-13-29 | 60 | 60¼ | 1.75 qu. June 15 |
| Penn-Dixie Cem. com. | 8-13-29 | 13⅛ | 13½ | |
| Penn. Glass Sand Corp. 6's† | 8- 7-29 | 98 | 101 | |
| Penn. Glass Sand pfd. | 8- 7-29 | 115 | ..... | |
| Petoskey P. C. | 8-13-29 | 9½ | 10½ | 1½% qu. |
| Riverside P. C. com.[5] | 8-10-29 | 22 | ..... | |
| Riverside P. C. pfd.[9] | 8-10-29 | 96 | ..... | 1.50 qu. Aug. 1 |
| Riverside P. C., A[9] | 8-10-29 | 16 | 18 | 31¼c qu. Aug. 1 |
| Riverside P. C., B[9] | 8-10-29 | 5 | ..... | |
| Santa Cruz P.C. 1st 6's, 1945 | 8-10-29 | 108½ | ..... | 6% annual |
| Santa Cruz P. C. com. | 8-10-29 | 93 | ..... | $1 qu. July 1 |
| Schumacher Wallboard com. | 8-10-29 | 13⅝ | 14⅞ | |
| Schumacher Wallboard pfd. | 8-10-29 | 23½ | 25½ | |
| Southwestern P. C. units[44] | 8-10-29 | 270 | ..... | |
| Standard Paving & Mat. (Can.) com. | 8-12-29 | 32 | 32½ | 50c qu. Aug. 15 |
| Standard Pav. & Mat. pfd. | 8-12-29 | ..... | 97 | 1.75 qu. Aug. 15 |
| Superior P. C., A | 8-10-29 | 43 | 44 | 27½c mo. Aug. 1 |
| Superior P. C., B | 8-10-29 | 23½ | 24¼ | |
| Trinity P. C. units[37] | 7-26-29 | 142 | 150 | |
| Trinity P. C. com.[37] | 7-26-29 | 51 | ..... | |
| Trinity P. C. pfd.[29] | 8-10-29 | 105 | 110 | |
| U. S. Gypsum com. | 8-13-29 | 72 | 73 | 2% qu. Sept. 30 |
| U. S. Gypsum pt. paid | 8-13-29 | 66 | 66½ | |
| U. S. Gypsum pfd.[29] | 8-10-29 | 122 | 126 | 1¾% qu. Sept. 30 |
| Universal G. & L. com.[3] | 8-13-29 | ..... | 1 | |
| Universal G. & L. pfd.[3] | 8-13-29 | 8 | 10 | |
| Universal G. & L., V.T.C.[3] | 8-13-29 | No market | | |
| Universal G. & L. 1st 6's[3] | 8-13-29 | 60 | ..... | |
| Warner Co. com.[16] | 8-12-29 | 44 | 47 | 50c qu. July 15 |
| Warner Co. 1st 7% pfd.[16] | 8-12-29 | 100 | ..... | 1¾% qu. July 1 |
| Warner Co. 1st 6's[8] | 8-14-29 | 98 | 99 | |
| Whitehall Cem. Mfg. com.[26] | 7-30-29 | 125 | ..... | |
| Whitehall Cem. Mfg. pfd.[26] | 7-30-29 | 50 | ..... | |
| Wisconsin L. & C. 1st 6's[15] | 8-14-29 | 97 | ..... | |
| Wolverine P. C. com. | 8-13-29 | 5 | 6 | 15c qu. Aug. 15 |
| Yosemite P. C., A com.[44] | 8-10-29 | ..... | 10 | |

*Ann. interest due May and Nov. 1. Semi-ann. coupon of $32.50 paid Nov. 1. †Called for redemption at 105, July 1.

[1]Quotations by Watling Lerchen & Hayes Co., Detroit, Mich. [2]Quotations by Bristol & Willett, New York. [3]Quotations by Rogers, Tracy Co., Chicago. [4]Quotations by Butler Beadling & Co., Youngstown, Ohio. [5]Quotations by Freeman, Smith & Camp Co., San Francisco, Calif. [6]Quotations by Frederic H. Hatch & Co., New York. [7]Quotations by F. M. Zeiler & Co., Chicago, Ill. [8]Quotations by Dillon, Read & Co., Chicago, Ill. [9]Quotations by A. E. White Co., San Francisco, Calif. [10]Quotations by Lee Higginson & Co., Boston and Chicago. [11]Nesbit, Thomson & Co., Montreal, Canada. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [13]Peters Trust Co., Omaha, Neb. [14]First Wisconsin Co., Milwaukee, Wis. [15]Central Trust Co., of Illinois, Chicago. [16]J. S. Wilson, Jr., Co., Baltimore, Md. [17]Chas. W. Scranton & Co., New Haven, Conn. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hoit, Rose & Troster, New York. [20]Quotations by Bond & Goodwin & Tucker, Inc., San Francisco. [21]Baker, Simonds & Co., Inc., Detroit. [22]Hemphill, Noyes & Co., New York City, N. Y. [23]Blair & Co., New York and Chicago. [24]A. B. Leach & Co., Inc., Chicago. [25]Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [27]J. G. White & Co., New York. [28]Mitchell-Hutchins Co., Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago. [31]McIntyre & Co., New York, N. Y. [32]A. E. Ames & Co., Toronto, Can. [33]Boettcher Newton & Co., Denver, Colo. [34]Kidder, Peabody & Co., Boston, Mass. [35]Farnum, Winter & Co., Chicago. [36]Hanson and Hanson, New York. [37]S. F. Holzinger & Co., Milwaukee, Wis. [38]McFetrick & Co., Montreal Que. [39]Tobey and Kirk, New York. [40]Steiner, Rouse and Stroock, New York. [41]Hornblower & Weeks, New York City and Chicago. [42]E. H. Rollins, Chicago, Ill. [43]Jones, Heward & Co., Montreal, Que. [44]Tenney, Williams & Co., Inc., Los Angeles, Calif. [45]Taylor Ewart & Co. [46]Stein Bros. & Boyce, Baltimore, Md. [47]Bank of Pittsburgh, Pittsburgh, Pa. [48]E. W. Hays & Co., Louisville, Ky. [49]Blythe Witter & Co.

## INACTIVE ROCK PRODUCTS SECURITIES (Latest Available Quotations)

| Stock | Price bid | Price asked |
|---|---|---|
| American Brick Co. pfd. (sand-lime brick) 13 sh.[6] | par 25 | 24 |
| American Brick Co. pfd., 5 sh.[2] (par 25) | 25 | ..... |
| Atlantic Gypsum Products[6] com., 200 shares | $2 per share | ..... |
| International Portland Cement Co., Ltd., pfd. | 30 | 45 |
| Seaboard P. C.[1] 6% bonds ($7,500) 7-1-27. July, 1910, and subsequent coupons attached | $10 for the lot | ..... |
| Southern Phosphate Co.[6] | 1¼ | ..... |
| Universal Gypsum com. free stk.[1] 300 shares | $75 for the lot | ..... |
| Universal Gypsum com.[1] 153 shares (no par) | $51 for the lot | ..... |
| Vermont Milling Products Co. (slate granules), 22 sh. com. and 12 sh. pfd.[6] | $1 for the lot | ..... |
| Winchester Brick Co., pfd., sand lime brick[5] | 10c | ..... |
| Winchester Rock Brick Co., pfd., 1 share (par $25) and 1 share com. (par $10)[6] | $8 for the lot | ..... |

[1]Price obtained at auction by Adrian H. Muller & Sons, New York. [2]Price at auction by R. L. Day & Co., April 24, 1929. [5]Price obtained at auction for lot of 50 shares by R. L. Day & Co., Boston, Mass. [6]Price obtained at auction by Wise Hobbs and Arnold, Boston, Mass., June 19, 1929.

## Ohio River Sand Co., Louisville, Stock Offering

J. B. HILLIARD AND SON, Louisville, Ky., are offering 7% cumulative, first preferred ($100 par), 6% convertible preferred ($50 par), and common shares ($10 par) in the Ohio River Sand Co., Louisville, Ky. The offering is 2 shares 7% first preferred, 3 shares 6% convertible preferred and 2 shares common for $380, to yield 6%. Unit receipts are issued as of June 1, 1929. Application has been made to list these units on the Louisville Stock Exchange. Extracts from the prospectus, based on a letter of Thomas J. Duffy, president of the company, gives the following information in regard to the company and its operations:

*HISTORY OF THE COMPANY*—The Ohio River Sand Co. was organized and incorporated under the laws of the State of Kentucky in 1891, with a paid in capital stock of $6,000, consisting of 60 shares of capital stock of the par value of $100 each. At that time the company conducted solely a marketing business, buying its sand—the only commodity it handled—from other producers.

Subsequently, as the demand for clean washed river sand increased, and the use of concrete became more general, with gravel used as its coarse aggregate, the company out of its earnings acquired its own dredging and marine equipment, and dug its own sand and gravel. The business of the company is that of producing and marketing washed and screened river sand and gravel exclusively, in the sizes and grades the market demands, and the business is conducted on practically a cash basis. It has grown from a small struggling company capitalized at $6,000, with an average profit for the first few years of $3,000 or $4,000 in 1891, to one of the largest single unit sand companies in the country. During that time book assets increased to something in excess of $2,250,000 solely through the reinvestment of earnings.

Richard K. Meade, chemical and industrial engineer, has recently estimated the present value of ground, material, equipment and leases at a sum greatly in excess of the proposed capitalization.

The sand and gravel obtained by the company is dug from locations in the Ohio River adjacent to and above Louisville, and complies with both municipal and government specifications, and is being supplied for use in private and railroad work as well as municipal, state and government projects.

*PLANT*—The plant of the company is located on the north side of the River Road, extending eastwardly from First street, approximately one and one-half city blocks, and from the River Road to the Ohio River, a distance of about 500 ft.

It is equipped with three railroad switches capable of holding 30 cars at one time, and connected with the main line of the L. & N. R. R. with transfer privileges to other lines, thereby permitting carload shipments at favorable freight rates to points, east, west or south of Louisville.

The material after being unloaded from barges, is fed through a hopper onto a belt conveyor which travels on Timken bearings mounted on steel frame work and resting on reinforced pillars. By means of the conveyor system, the material is deposited into a series of concrete hoppers for local truck deliveries; into cars for railroad shipments, or into storage piles of 100,000 tons capacity, from which it is reclaimed for emergency or winter loadings. The unloading system is modern and efficient and it is possible to handle sand and gravel very economically in this yard. All equipment is in first-class shape.

The yard is paved throughout with concrete, with all necessary retaining walls separating the sand and gravel from driveways. That part of the property abutting the river is amply protected from damage by high water with concrete and heavy rip rap retaining walls.

The company owns the fee simple to a lot of land, 147½ ft. in width on the north side of the River Road and running 500 ft. to the river. In addition, it leases from the City of Louisville under favorable terms, additional land on either side of above mentioned lot, so that its total river frontage is in excess of 800 ft.

The company has a new office building of brick, two stories in height, necessary garages, machine shops, storage building for emergency equipment, and other facilities for conducting its business. It owns and maintains in its own fully equipped shop a fleet of ten automatic dump trucks.

*RIVER EQUIPMENT* — The river equipment consists of one steel hull tow boat with capacity for towing eight barges at one time; 20 steel barges, practically all new, with an average capacity of 600 tons per barge; also two modern all steel dredges of the ladder type having a combined capacity of 6,000 tons of finished product daily. Each unit digs, washes and separates the sand and gravel into the specific grades required, depositing each grade into a separate barge, which is towed to the company's landing where it is unloaded by a Brownhoist bridge crane using a 3 yard clam shell bucket. This river equipment is all strictly modern of large output and in fine condition.

*SUBSIDIARY*—The Ohio River Sand Co. owns 65% of the stock of the River Coal and Supply Co., incorporated under the laws of Indiana, and doing business in New Albany and surrounding territory. The business of this company consists in the buying and selling of sand, gravel and coal, both wholesale and retail, and also handles brick, cement, lime and general building supplies. The River Coal and Supply Co. owns in fee simple the land on which the plant is located, in addition to river frontage and unloading appliances, and has no mortgages or other funded debt.

*SOURCE OF SUPPLIES AND RESERVES*—The Ohio River Sand Co., as before stated, obtains its material from the bed of the Ohio River. Some of the locations are on leases of riparian rights from owners of land on the Kentucky shore, and in addition the company holds a franchise or 20-year lease on one-half of the bed of the Ohio River from the middle of the river to the Indiana shore in Oldham County, Kentucky, aggregating some 8 miles in length. It may not be generally known, but the title and jurisdiction of the State of Kentucky extends across the Ohio River to low water mark on the Indiana side, so that the whole of the Ohio River is in the limits of the State of Kentucky and under jurisdiction of that state.

The Kentucky legislature of 1928 passed an act permitting the counties bordering the Ohio River to create and sell franchises for the privilege of digging the sand and gravel from the middle of the river to the Indiana shore, and this act has been tested and approved by the Court of Appeals of Kentucky, and the lease from Oldham County is in accord with the decision of the Court of Appeals.

The company owns or leases sufficient digging grounds for any possible demand for a great many years to come. Mr. Meade states that the two islands owned in fee and their shores "contain enough sand and gravel to meet any possible demand from the company for a practically unlimited period." Mr. Meade further states the "properties under lease contain more sand and gravel than the company can possibly use during the periods of their lease—in fact these leases if extended will be sufficient to furnish a practically unlimited supply of gravel."

*ISLANDS*—The company owns the fee simple title to two islands in the Ohio River. The first, Towhead Island, is located opposite the City of Louisville just a short distance above the plant of the company. It is 4,330 ft. long and has an average width of 250 ft.

The other, known as Twelve Mile Island, is located about 9 miles east of the city limits of the City of Louisville, and has a length of 8,200 ft. with an average width of 900 ft.

Both islands have been tested by borings and an excellent quality of material underlies them. The estimated quantity of material in the two islands, comprising about 300 acres, is in excess of 20,000,000 tons, and is being held in reserve for future operations. Neither of them has been touched by the company up to this time, which assures a source of supply for years to come.

*MARKET* — The market of the Ohio River Sand Co. is chiefly the City of Louisville and its environs including New Albany, Ind., and Jefferson County, Ky., in which the first city is located.

The company supplies in excess of 60% of the demand for sand and gravel in this territory. It also ships material by rail. Mr. Meade estimates that there is a market for 680,000 tons of gravel and crushed stone and 335,000 tons of sand for concrete. In the City of Louisville and Jefferson County alone increase in the demand will naturally occur from normal growth of building operations in and around Louisville.

*CAPACITY*—It would be conservative to figure the present capacity of the company at 1,250,000 tons annually. This is about 30% more than the present demand for this plant.

*CAPITALIZATION*—On completion of the present financing, the capitalization of the company will be as follows:

| | Authorized | Outstand'g |
|---|---|---|
| 7% first preferred stock ($100 par) | $1,300,000 | $1,150,000 |
| 6% convertible preferred ($50 par) | 750,000 | 750,000 |
| Common stock ($10 par), sh. | *51,000 | 36,000 |

*15,000 shares reserved for conversion of 15,000 shares convertible preferred stock.

The company has no bonded debt and on completion of present financing will have no bank debt.

*FINANCIAL*—The company has been only an occasional borrower from banks and then only when substantial amounts of new equipment have been purchased. Approximately 80% of its business is on a cash or 30-day basis and credit losses have been practically nil. The company has always had available a substantial line of credit at its banks for use in case of necessity.

The payment of dividends on the first

preferred stock and on the convertible preferred stock requires no additional cash outlay, inasmuch as the average cash dividends paid out during the past five years are within a few hundred dollars of the sum required for dividends on both preferred stocks.

The management of the company intends to initiate dividends on both peferred stocks immediately from date of issue.

*EARNINGS*—The books of the company have been audited annually by Public Accountants and an examination was made by Ernst and Ernst for the years 1926, 1927 and 1928, and Meldrum and Meldrum, accepting the elimination of certain capital items as determined by Ernst and Ernst's examination, have made an examination for the years 1924 and 1925 and state that, after deducting depreciation allowed by the government, after elimination of certain capital items, after deducting from each year's earnings taxes chargeable thereto and after making allowance for savings in salaries and in interest as a result of this financing, the adjusted earnings for the years 1924 to 1928, inclusive, are as follows:

EARNINGS OF OHIO RIVER SAND CO., 1924-28, INCLUSIVE

| Year | Adjusted earnings | Dividend 11,500 shares preferred | Balance available for convertible preferred | Dividend 15,000 shares $3 convertible preferred | Total dividend and $10,000 sinking fund | Balance for 36,000 shs. common |
|---|---|---|---|---|---|---|
| 1924 | $324,000.00 | $80,500.00 | $243,500.00 | $45,000.00 | $135,500.00 | $188,500.00 |
| 1925 | 271,000.00 | 80,500.00 | 190,500.00 | 45,000,00 | 135,500.00 | 135,500.00 |
| 1926 | 283,000.00 | 80,500.00 | 202,500.00 | 45,000.00 | 135,500.00 | 147,500.00 |
| 1927 | 341,000.00 | 80,500.00 | 260,500.00 | 45,000.00 | 135,500.00 | 205,500.00 |
| 1928 | 249,000.00 | 80,500.00 | 168,500.00 | 45,000.00 | 135,500.00 | 113,500.00 |
| Total | 1,468,000.00 | | | | | |
| Average | 295,600.00 | 80.500.00 | 213,100.00 | 45,000.00 | 135,500.00 | 158,100.00 |

*PROVISIONS OF FIRST PREFERRED STOCK* — The first preferred stock shall be entitled to a dividend at the rate of 7% per annum, payable in quarterly installments, beginning September 1, 1929, and shall be cumulative from June 1, 1929. In the event of dissolution of the company, whether voluntary or involuntary, such stock shall be preferred as to the par value thereof, and accrued dividends over any other stock of the company. Such stock shall be callable at any time for sinking fund purposes at $107 per share and after June 1, 1932, at any dividend period at $107 per share, and accrued dividends on 30 days' notice. No bonded debt or any other issue of security having priority over this preferred stock (except banking indebtedness incurred in ordinary course of business and maturing within 12 months from its date, or purchase money lien notes or mortgage bonds not in excess of 67% of the value of the property hereafter acquired) shall be created by the company, except by written consent of the holders of 75% of this stock. Nor shall there be any increase in the authorized amount of such preferred stock except by the written consent of the holders of 75% thereof. Such stock may be called at any dividend period, but if less than the entire amount outstanding is called, the certificates called shall be determined by lot. A sinking fund shall be created consisting of 3% of the net earnings of the company each year, with a minimum amount of $10,000 per annum. The term, "net earnings," as used herein, shall be deemed to mean earnings and profits after payment of all operating charges and the setting aside of the reasonable and proper sum for depreciation in accordance with sound principles of accounting. This sinking fund shall be set aside at the end of each fiscal year, and shall be used to purchase the preferred stock if the same is available in the market, at less than the call price of $107 per share, and if not, to call and purchase said stock at $107 per share and accrue dividends, but in either event the stock so purchased by the sinking fund shall remain alive and the income thereon shall be added to the sinking fund until all of the stock has been so purchased. But none of said stock so purchased for the sinking fund shall thereafter be reissued or sold by the company. Said preferred stock shall be entitled to said dividend of $7 per annum, before any dividend is set aside or paid on second preferred or common.

*PROVISIONS OF CONVERTIBLE STOCK* — Second preferred convertible stock shall be entitled to dividends at the rate of 6% per annum, payable quarterly, beginning September 1, 1929, and said dividends shall be cumulative from June 1, 1929. This stock shall be preferred in the event of the dissolution of the company, whether voluntary or involuntary as to accrued dividends, and $50 per share principal before anything is set aside or paid on the common stock or any other stock, except the first preferred stock. This stock shall be converted at any time at the option of the holders thereof, share for share, into common stock of the company. The second preferred stock shall be callable by the board of directors on any dividend date at the rate of $55 per share, and accrued dividends. But the holder of said stock shall have 30 days after the notice of said call to retire the same to convert it into common stock of the company, share for share. Said stock shall have no right to vote and the amount thereof shall not be increased, nor shall there be any increase in the authorized issue of the common stock, except by the written consent of the holders of two-thirds of the convertible preferred stock. The conversion rights of the second preferred stock as herein provided entitling the holders of said convertible stock to acquire 15/51% of the authorized common stock, should all of it be converted shall in no wise be adversely affected by any increase in the common stock or any change in the par value thereof but the above proportion applies only in the event the entire issue of 15,000 shares is converted and should any of it be called and redeemed by the company, said proportion shall be correspondingly reduced. Said stock shall be entitled to a dividend at the rate of 6% before any common dividend.

*MANAGEMENT* — The management, which has been in charge of this company almost from its beginning, is retaining a majority interest in the common stock and a very substantial interest in both preferred issues, and will continue in active operation of the company and its affairs.

## Warner Co. Certificates Ready

TEMPORARY $7 first preferred stock certificates with temporary warrants attached are now exchangeable for definitive stock certificates with definitive warrants attached at the Fidelity-Philadelphia Trust Co., 135 South Broad street, Philadelphia.

## Brazilian Portland Cement Co. Earnings Improved

PROGRESS in the portland cement industry in Brazil is revealed in the annual report of Canadian Foreign Investment Corp. just issued. The corporation's earnings for 1928 amounted to $149,200, this revenue being derived entirely from the amounts credited to the company during the year for interest on the gold mortgage of $750,000, and the additional advance of $1,250,000 to the Brazilian Portland Cement Co., Ltd.

The president's report says in part:

"During the early part of the year the profits earned in the Brazilian cement plant were disappointing, those in the first four months being barely sufficient to meet interest charges on the mortgage and the advances; but from May on, results showed great improvement and the profit for the year amounted to about $170,000 after payment of the interest charges on the mortgage and other advances.

"At the beginning of the present year several large orders were received, the unfilled orders at the end of January being over 290,000 bbl.; and, in view of this condition, the directors decided that the capacity of the plant should be increased immediately. Machinery and equipment have been ordered and the necessary construction work is now under way for an additional capacity of 1300 bbl. per day. While the capacity of the present plant is not quite as great as we estimated, being from 600,000 to 650,000 bbl. per year, with the additional unit our capacity should be approximately 1,000,000 bbl. per annum.

"To provide funds for this addition, the directors have created an issue of bonds ranking ahead of the present preferred stocks of the company, which owing to legal technicalities involved in connection with mortgages in Brazil, can only be secured by a form of gold debenture stock issued by the Brazilian Portland Cement Co. These bonds are protected in such a way that the security obtained will be identical with that from a first mortgage, the rate of interest and amortization being the same."

## Ideal Cement Bond Conversions

APPROXIMATELY $4,350,000 of the Ideal Cement Co.'s $8,500,000 issue of convertible debentures put out a year ago have already been converted into common stock, according to an announcement. The amount of debentures still in the hands of the public is $4,149,300. Until July 1 holders had the privilege of converting debentures into common stock at the rate of $75 a share. During the next year the conversion rate will be $80 a share, with an advancing rate for following years. The convertible debentures were issued July 1, 1928, to provide for the retirement of the preferred stock.

## Milnor Company Building New Steam Dredge

CONSTRUCTION of a new steam dredge for the H. C. Milnor Sand and Lime Co., Knoxville, Tenn., will be started shortly in the yards of the Knoxville Marine Ways. The boat will be 108 ft. long, 26 ft. wide and 4 ft. deep. A digging ladder, steam operated, will be installed on the new dredge.

Lumber for the boat is now being shipped from Seattle, Wash. It is Oregon fir of required length.

Recently one of the Milnor dredges sank at the lower end of Looney's Island in the Tennessee river, three miles below Knoxville. Attempts to raise it from the 18 ft. of water failed. The new dredge is being built to replace the one that sank.

## Northwest Magnesite Extending Aerial Tramway

AN aerial tramway to connect the Allen quarry with the Finch quarry of the Northwest Magnesite Co., five miles west of Chewelah, Wash., is to be installed by the Riblet Tramway Co. of Spokane. It will be about half a mile in length and join the main tramway that connects the Finch quarry with the calcining plant a mile south of Chewelah.

Ground is being cleared and the tramway will be installed shortly.—*Spokane* (Wash.) *Review.*

## Rotarians Lunch in Alpha Mine 600 Feet Underground

THE management of the Alpha Portland Cement Co. delightfully entertained the Ironton Rotary Club with a light luncheon and tour of inspection through their limestone mine recently. Eighty-five Rotarians accepted the invitation and upon their arrival at the plant they were escorted to the opening of the mine and were let down into the mine through a concrete lined shaft. When the last cage load of men reached the bottom all were directed down the well lighted main hallway and into a large room where an "L" shaped table with a luncheon on it awaited them. After the lunch and their meeting was over the members of the club were shown all the working places and things of interest throughout the mine.

A good description of this mine is to say that it is a "rock city," for the tunnels and working places are driven 30 ft. wide and 40 ft. high, having a limestone top and a limestone bottom. The stone is drilled with air drills, blasted with dynamite, loaded in cars by electric shovels and transported to the hoist by electric locomotives. Machine shop, blacksmith shop, air compressor and pumps are also located in the mine. When you first step off the hoist at the bottom is a nicely built room with a sign printed over the door "First Aid." Here is where all the minor injuries are dressed. This room is well equipped for this work. On the outside wall of this building is a large bulletin board where all the latest safety news is posted.

Making this mine safe is a job of utmost importance. This cannot be done wholly by erecting safeguards, shields, etc., as very little can be safeguarded, therefore it requires continuously close watching and educating the men and cooperation among all. The walls and ceilings are continually being inspected and scaled of all loose stone. This mine was awarded the bronze trophy "Sentinels of Safety" given by the United States Bureau of Mines for going through the year of 1928 working the most man hours of any non-metal mine in the United States without a lost-time accident. It also received recognition for going through the year of 1927 without a lost-time accident. The last lost-time accident this mine had was September 21, 1926, making a record of 1044 days.

***Rotary Club enjoys luncheon 600 ft. underground in Alpha company's Ironton, Ohio, limestone mine***

## Fountain Company Improving Its Gravel Plant

A $25,000 improvement and expansion program, including the laying of a half-mile industrial railroad track, was announced recently by Fred H. Bullen, president of the Fountain Sand and Gravel Co., Pueblo, Colo. Work will be on the company's plant west of the county bridge and is to be started immediately.

The industrial railroad track will extend about one-half mile south of the county road and will be utilized in hauling sand and gravel to the company's Park Hill plant. Under the plan sand will be taken to the plant both by the cableway from the Arkansas river and by a small locomotive and cars employed on the new track. The additions and improvements will increase the capacity approximately 100%.—*Pueblo* (Colo.) *Star-Journal.*

## Medusa Stockholders Approve Merger Plans

STOCKHOLDERS of the Medusa Portland Cement Co., recently voted to carry out plans of the directors by which the Medusa company acquires the Newaygo Portland Cement Co. of Newaygo, Mich., and the Manitowoc Portland Cement Co. of Manitwoc, Wis., through an exchange of stock. Complete details of these plans were given in ROCK PRODUCTS, August 3 issue.

The Newaygo company will continue to operate its plants and market its products under present brands.

J. B. John, general manager of the Newaygo plant, will head both companies and C. C. West, will be vice president of the Medusa company.

## Wisconsin Lime and Cement Co. Sold to Consumers Co.

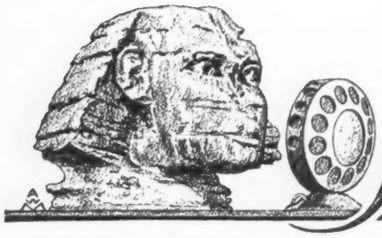
CONTROL of the Wisconsin Lime and Cement Co., Chicago, Ill., has passed to the Consumers' Company, according to a report in the *Chicago Journal of Commerce.* The terms of the deal were not disclosed, but it is understood to have involved a substantial cash consideration.

The Wisconsin company operates a sand and gravel plant of 3500 cu. yd. per day capacity at Crystal Lake, Ill. It is also one of the largest dealers in building materials in Chicago and throughout the middle west, operating 13 distributing yards in the Chicago territory.

Such a combination makes the Consumers' company a large factor in the building materials market of Chicago and vicinity.

The Wisconsin company, as of December 31, last, had total asets of more than $3,000,000. Profits for the year ended December 31, 1928, amounted to $250,255 after depreciation, interest, etc., but before taxes.

It is understood that there will be no change in the management of the Wisconsin company as a result of the purchase.



# Hints and Helps for Superintendents

## Foot Valve Protection

THERE ARE several patented devices for protecting the foot valve of a water pump from becoming clogged with floating debris, which are highly satisfactory. However, the method used at the Sturm and Dillard plant near Circleville, Ohio, works very satisfactorily. This consists of a perforated caisson approximately 20 ft. in diameter set in a small recess in the bank of the river near the plant. By setting it back in this recess, danger of being washed away by flood waters is prevented, as back waters at flood times merely pass over the structure and do no damage. The caisson is of such large size and so amply perforated that it is practically impossible to become fouled with leaves or rubbish which might cut off the water supply. The levers and ropes shown in the illustration are for raising and lowering the pump's foot valves.

***Protecting the valves of a water pump***

## Portable Re-screening Plant

AT THE GATES plant of the Dolomite Products Co., Inc., Rochester, N. Y., it became desirable to rescreen the stockpiles of fines, for it contained some oversize that had commercial value as an aggregate and also left a better minus ¼-in. material for manufacture of concrete products.

To rescreen this pile, John Odenbach, president of the company, designed and installed a simple portable screening plant consisting of a wood hopper over a Niagara vibrating screen, the whole structure mounted on four rollers so as to be moved.

The hopper is filled by a clamshell crane and the sized products are chuted to trucks or to temporary ground storage.

***Portable re-screening plant by which marketable stone is recovered from stockpiles of fines***

## Combination Track Shifter and Ballast Spreader

J. L. ALLEY, manager of the Acme Gravel Co. of Indianapolis, has built a novel combined track shifter and ballast spreader by cutting the transmission shaft on a five-ton truck and keying on to this shaft a suitable pinion gear. This gear in turn drives a countershaft that serves the two racks and pinions constituting the track moving features. After placing the first mentioned gear, the shaft was made serviceable for this use by a suitable clutch.

The two racks, one at each end of the truck, are parts of an old shovel stick and have on their lower end a plate-like shoe that when forced against the ground readily moves the track to which the truck has been clamped.

The whole mechanism was designed to fit the truck, using the holes already bored in the chassis, and can be removed easily so as to make the truck available for other uses. The wheels have had steel flanged rims shrunk on for railroad use, which also are removable.

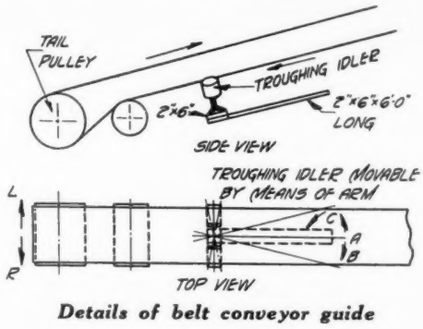
In front are two wing-like projections that can be lowered in the event the truck is to be used as a ballast spreader. The designer of this truck says that two men can do the work of 14 by this arrangement.

***Home-made combination for track shifting and ballast spreading***

## Belt Conveyor Guide

By J. PALMER CAMM
Watonga, Okla.

THE tendency of conveyor belts to crawl to one side of the pulleys is a source of annoyance to many operators. Further, ordinary devices such as upright rollers on either side of the belt to keep the belt centered, cause the belt to receive considerable wear along the edges. A most satisfactory means to overcome this difficulty is illustrated herewith; it has been in operation for over a year and has worked to perfection.

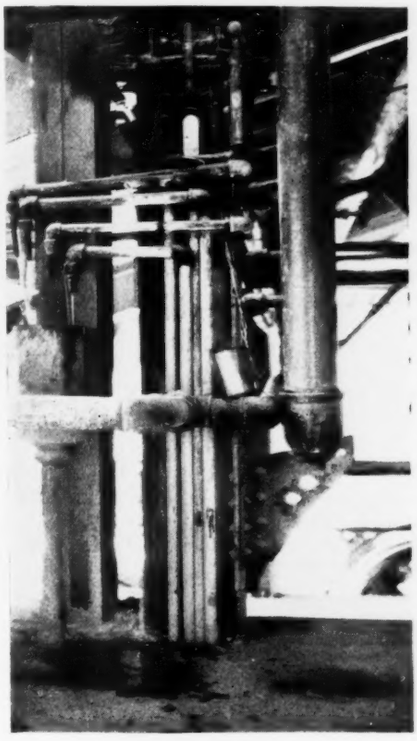



***Details of belt conveyor guide***

The details are simple: place a troughing idler on the under side of the return belt as shown in the sketch. Then, should the belt go in direction *L* on sketch, it can be brought back to center by moving the troughing idler (which is pivoted at its center) to position *C*. And in the same manner, should the belt move in direction *R* it can be brought back to center by moving troughing idler to position *B*.

## Feed Water Tell-Tale

THE "coco rock" and shale used for production of portland cement at the Cuban plant of the International Portland Cement Co. is first partially disintegrated in short pug mills similar in design to the ordinary log washer. The material is supplied with water to each pug mill, and as a visible means of assurance that water is being supplied each mill, a ½-in. pipe has been tapped off from the header supplying each pug mill. These pipes all converge to a point within an easily visible range of the operator and he can tell at a glance if water is being properly delivered to the mills. By noting the comparative velocity of water, the tell-tale outlets also give him an idea as to the volume of water supplied.



***Feed water tell-tale***

## Unusual Task Performed with Crane and Bucket

THE POWER shovel has been called upon to perform many duties about plants which are far removed from its ordinary run of work. As an example, its ability to serve as a pile driver is well known. However, the Cooksville Co., Ltd., of Canada found a really novel use for the Hayward bucket on its Link-Belt crane.

According to H. D. Holland, superintendent of the Cooksville company, it was necessary to bend some steel reinforcing bars for the concrete forms during the construction of the new plant. This was done easily by placing several rods through the arms of the Hayward clamshell bucket and then opening the bucket, thereby bending the rods to the exact shape required. The illustration shows how the rods were placed to perform the bending.

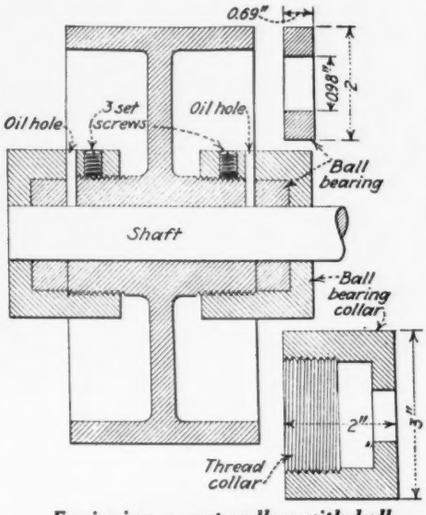
## Truck Loading Hopper

THE STEEL storage bins at the Greencastle, Ind., plant of the Midwest Crushed Stone Co. are primarily built for loading railroad cars and therefore have a higher bottom floor level than necessary for truck loading. A hopper at the side is used for loading trucks and this not only acts as a measuring pocket but prevents unnecessary spillage which might result were the crushed stone chuted direct to trucks. The hopper has a suitable gate at the bottom.

***Truck loading hopper prevents spillage in loading***

## Equipping a Cast Pulley With Ball Bearings

TO ELIMINATE rattle, noise, and friction a small high-speed pulley was equipped with ball bearings on each side of the hub. As the hub diameter was too small to have the ball race set into it by counterboring the hub, the method adopted was:




***Equipping a cast pulley with ball bearings***

The outside diameter of the hub was turned down to 2.57 in., ten threads being cut on it per inch. The ball bearings used on this pulley were HB-DWF, and the 1-in. shaft was turned down to allow the ball race to be pressed on. These ball bearings were 2.441 in. in outside diameter, 0.984 in. in inside diameter and 0.67 in. thick. The collar to hold the race in place was made to fit it at the bottom, allowing it to slide in the collar against the shoulder. The collar was threaded for the distance from the race to the end, fitting the threads on the hub. If the hub should be smaller than the outside diameter of the race, it should be turned down in a lathe to a size sufficient to fit.

As the race will be pressed on the shaft, and the collar will be against the ball-bearing face, oil can be held in the center of the pulley, which will have about 0.004 in. clearance on the standard 1-in. bore pulley. Most pulley bores are larger than the standard, which will give more room for an oil film. The oil holes at each end should be located next to the ball bearing.—R. N. Thomas in *Engineering and Mining Journal.*

***Bending reinforcing rods with the aid of grab bucket and crane***

# The "W. W. Fischer," South's Largest Diesel Towboat for Sand and Gravel

THE NEW Diesel towboat *W. W. Fischer*, recently put in service by the Central Sand and Gravel Co., Memphis, Tenn., is said to be the largest Diesel towboat ever constructed for the sand and gravel trade, and also the largest Diesel towboat constructed in the south, equal in power to any direct connected Diesel powered river towboat anywhere. Memphis will be the home port for the boat, which will be in Mississippi river service, towing barges of sand and gravel from various points to the Central Sand and Gravel Co. plant. The boat was constructed by the Nashville Bridge Co., Nashville, Tenn.

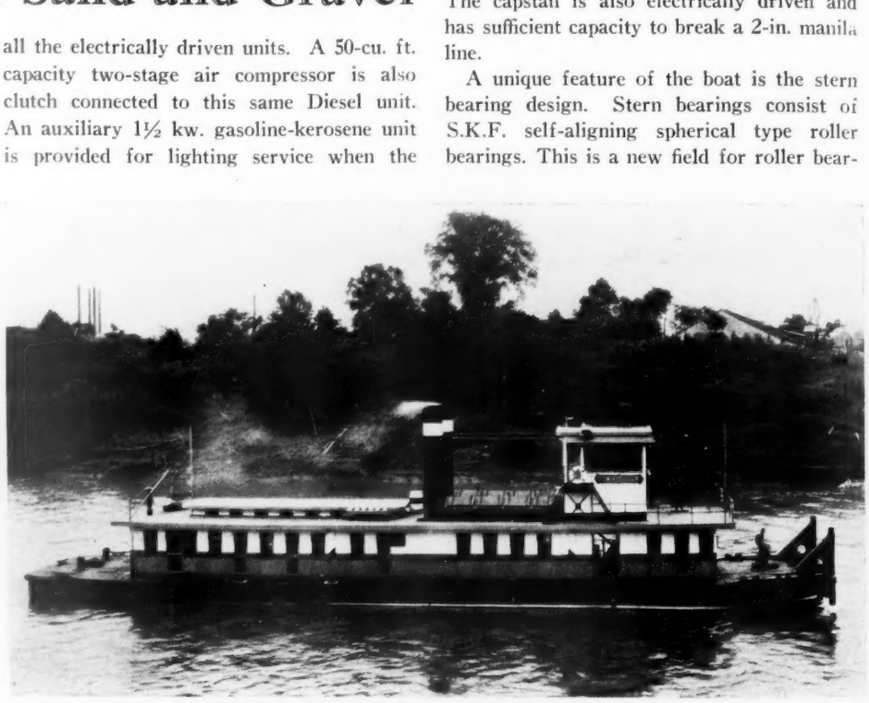
The *Fischer* is of the twin screw tunnel type with model bow and special overhung deck construction on the head for towboat service. General dimensions are: Length, 120 ft.; beam, 26 ft.; depth, 8 ft.; draft, 5½ ft. The power rating of the new boat is 720 hp.

The boat is equipped with two 360-hp., 6-cyl. Fairbank-Morse, two cycle, solid injection, marine Diesel engines turning up 250 r.p.m. The engines are direct connected to the propeller shafting which run in SKF self aligning roller bearings throughout. The propellers are 6 ft. in diameter and are of the four bladed removable fluke type made of manganese bronze.

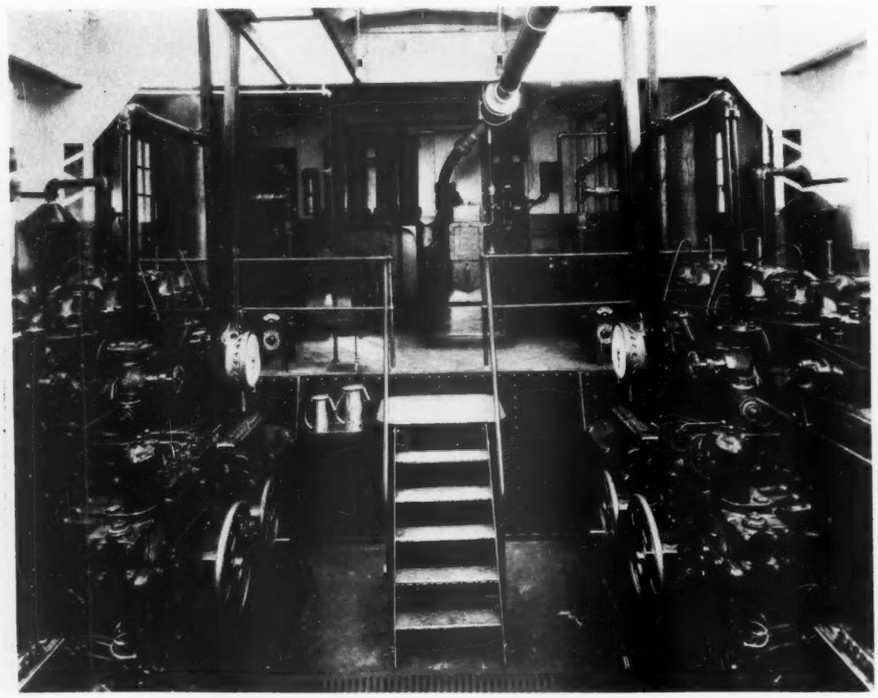
The auxiliary power plant consists of a 25-hp., 6-cyl. 6x6½-in., Fairbanks-Morse Diesel engine direct connected to an 18-kw. 125-v., generator which supplies power for all the electrically driven units. A 50-cu. ft. capacity two-stage air compressor is also clutch connected to this same Diesel unit. An auxiliary 1½ kw. gasoline-kerosene unit is provided for lighting service when the auxiliary power equipment is not running.

The Fairbanks-Morse 4x6-in. fully enclosed self oiling fire and bilge pump has a capacity of 50 g.p.m. at a pressure of 100 lb. per sq. in. and is driven by a direct connected 10-hp., 125-v., type DH motor. A 1500-gal. typhoon self-oiling pump for sanitary service and a 210-gal. home water plant for drinking water service is also provided. The capstan is also electrically driven and has sufficient capacity to break a 2-in. manila line.

A unique feature of the boat is the stern bearing design. Stern bearings consist of S.K.F. self-aligning spherical type roller bearings. This is a new field for roller bearing service; the principal problem was to obtain a minimum size of housing and a minimum distance from the bearing to the propeller with perfect exclusion of water and grit and with no adjustment necessary to maintain this condition. The stern tube and bearing assembly is carried full of oil under a gravity head greater than the water pressure and oil is retained by a special "Ellis" gland consisting of spring-loaded segmental sealing rings designed for automatic take up, in case of wear.



***The diesel towboat "W. W. Fischer" recently put in operation by the Central Sand and Gravel Co., Memphis***



***Engine room of the "W. W. Fischer" looking forward***

The boat has seven state rooms, two baths, two dining rooms and a kitchen in addition to the engine room and pilot house. Hull and cabin are built entirely of steel except the roof sheathing, which is wood, covered with canvas. Living quarters are sheathed inside with Carey asbestos wallboard.

Steering is taken care of by a special air motor arrangement controlled from a small lever in the pilot house. However, provision is made for manual steering in case of an emergency as is customary. During cold weather the boat is heated throughout by an oil burning steam system. Oil is also used in the galley for cooking purposes, hence only one fuel is carried in the hold.

Water for sanitary purposes is taken from the river and is put through a complete filtration and purification system so that pure clear water is available for washing and drinking purposes. As an extra precaution storage is provided in the hold for 1200 gal. of drinking water. This water is handled

through a separate plumbing system by an automatic electrically driven pump.

On a recent test trip the *Fischer* made the 35 miles between Memphis and the digger on the river in 8 hr. 45 min. against a four-mile current. On this trip she had in tow three empty all-steel barges 132 ft. long by 33 ft. beam drawing 12 in. of water. The return trip from the digger to Memphis with a tow cargo of 2000 tons of sand and gravel was made in 4 hr. 20 min. This permits a round trip in approximately 13 hr., where with the older steam tug which was replaced the same work required anywhere from 23 to 25 hr. for a round trip.

The boat will be placed in operation immediately between Memphis and Island 35, a short distance above Memphis. It is expected to handle a volume of material equivalent to that handled by the two other crafts operated by the Fischer firm and its subsidiary corporations, the Central Sand and Gravel Co. and the Greenville Sand and Gravel Co.

## San Joaquin Valley Gravel Companies Combine

MERGER of the Service Rock and Gravel Co. and the Grant Rock and Gravel Co., two of the largest producers of the kind in the San Joaquin Valley, California, was announced recently by H. M. Estes, president of the latter organization. The merger, effective on August 1, involved more than $750,000. The consolidated plants are located on the San Joaquin River, one near Friant and the other at Rockfield.

As yet, a definite organization has not been set up, but officers of the new company soon will be selected.

Dr. D H. Trowbridge, R. F. Felchin, Arthur W. Bernhauer and B. H. Nelson of Fresno, and John Patterson are directors of the Service concern, and A. H. Hills, H. G. Hills, Bruce Heathcote, Frank B. Peterson and J. S. Humberg of San Francisco, and H. M. Estes are directors of the other company. Headquarters will be in the Patterson building, Fresno, Calif.—*Fresno* (Calif.) *Republican.*

## Arkansas Lime and Stone Co. Electrifying Plant

GREATLY increased production is expected to result after the modernizing program is completed at the Arkansas Lime and Stone Co., Little Rock, Ark. New equipment is being installed and a complete change from steam power to electricity is being made. The new machinery includes a 3-stage air compressor driven by a 60-hp. motor and other equipment and operating motors

When alterations are completed the plant will produce about 20 cars of crushed stone per 8-hr. day.

The plant is located on the Missouri and North Arkansas railroad, seven miles east of Heber Springs. It is estimated that the Arkansas Lime and Stone Co.'s plant is worth $125,000. The quarry was originally known as the Libby quarry and it was started about 17 years ago when the M. & N. A. railroad was built. The business was at a low ebb when Messrs. Morris and their coworkers, Stacey and Trieschman of Little Rock, took charge of it about two years ago.

C. A. Morris of Searcy is president of the company, and his son, E. L. Morris, is superintendent. The company has its office in Searcy.—*Little Rock* (Ark.) *Democrat.*

## To Build Large Lime Plant at Tuscumbia

NATIONAL Lime, Cement & By-Products Corp., Stock Exchange Building, Buffalo, N. Y., is arranging for construction of new lime plant on site recently acquired near Tuscumbia, Ala., to cost more than $350,000 with equipment. It is expected to make machinery purchases early in fall. The company's engineers, Soule and Zepp, Baltimore, Md., are making plans to visit the property with the idea of locating the plant site and so forth. The preliminary surveys are being made by Autery Engineering Co., Sheffield, Ala.

The first unit of the proposed plant is to have a capacity of 100 tons of lime a day. The company owns 312 acres of lime rock deposits on the Tennessee river near Sheffield. Thomas K. Morris, Sheffield, Ala., is vice president and manager of production for the corporation and Francis L. Hull, of Buffalo, is president.

## Industrial Silica Acquires Bedford Company

THE INDUSTRIAL Silica Sand Corp., Youngstown, Ohio, has completed the purchase of the Bedford Silica Sand Co., Bedford, Ohio, and operation of the plant will be resumed at once. The Industrial corporation was recently organized as a result of a merger in which many of the silica sand companies of Ohio and Pennsylvania were combined. (See ROCK PRODUCTS, May 25, 1928, p. 96.)

I. A. Reader of Bedford, one of the former owners of the local plant, will be manager.—*Bedford* (Ohio) *News.*

## Beyrer Bros. Open New Gravel Plant

THE new sand and gravel plant, recently completed at a cost of about $30,000 at Mishawaka, Ind., by Beyrer Bros. Sand and Gravel Co., is now in production, according to the *South Bend* (Ind.) *Tribune.* Five storage bins, each of 200 cu. yd. capacity, have been erected. A slackline cableway excavator system, electrically operated, has been installed at the pit.

## Cincinnati Chosen for Crushed Stone Convention

THE 1930 convention of the National Crushed Stone Association will be held in Cincinnati, Ohio, January 20 to 23, inclusive, according to J. R. Boyd, secretary of the association. The board of directors also voted to hold the meetings and manufacturers exhibit at the Hotel Gibson.

## National Portland May Build Cement Mill in Mexico

PLANS are being considered by the National Portland Cement Co., of Houston, Tex., and Los Angeles, Calif., for the construction of a large cement manufacturing plant at Monterey, Mexico. An investment of several hundred thousand dollars will be made in the industry, it was stated. The Mexican and state governments will grant concessions for the proposed plant in the matter of tax exemptions and other favorable stipulations, the report says. The construction of highways, involving the building of many concrete culverts and bridges, and the construction of several large irrigation dams in the country has greatly increased the demand for cement in Mexico during the last few years.

## Southern Portland (Australia) Completes First Unit

COMPLETION of the first unit of the new cement mill under construction in New South Wales, Australia, by the Southern Portland Cement Co. is announced in a recent issue of the *Contract Journal* (England). The output of the new plant will be about 1200 bbl. per day.

The limestone to be used in the manufacture of cement is quarried at Marulan, 30 miles away from the works, which are situated at Berrima, and the coal supply will be obtained from the company's colliery in the district.

## Utah Rock Asphalt Company Installing Aerial Tramway

A NEW AERIAL tramway, three miles in length and a capacity of 75 tons of rock per hour, is under construction at the Sunnyside, Utah, quarries of the Utah Rock Asphalt Co. The new installation will do away with trucking of material over the steep road from the quarries to the mill. Later, a spur line connecting the plant with the main freight line will be built. The cost of the new tramway is given at about $75,000.

The Utah company has holdings of about 800 acres at Sunnyside and is now in its second year of active production. It operates a crushing and asphalt processing plant, shipping the finished product into adjoining cities and neighboring states. C. N. Power is president.—*Pueblo* (Colo.) *Star.*

# Output of Portland Cement in 1928

## Final Statistics Confirm Preliminary Estimates

STATISTICS relating to the portland cement industry in 1928 compiled by the United States Bureau of Mines, Department of Commerce, from the final returns of the producers for the year, which are, however, still subject to revision, confirm the estimates published by the Bureau fo Mines early in January.

Production of portland cement in 1928—176,195,488 bbl.—was the largest quantity manufactured thus far in any year, exceeding that in 1927, the next highest year in production, by 2%. Shipments of portland cement from mills in 1928 amounted to 175,734,974 bbl., valued at $275,885,902, an increase of 2% in quantity and a decrease of 1.1% in gross value. The average factory price per barrel in bulk in 1928 was $1.57, a decrease of 5 cents per barrel as compared with 1927. Stocks at the mills also increased, reaching a total of 22,917,896 bbl. on December 31, 1928, the greatest at the end of any year during which official records of stocks have been kept. They were about 2% higher than at the end of 1927.

From the reports of the producers showing mill shipments of portland cement into the various states estimates of per capita consumption in the accompanying table have been compiled. These are at best but approximations, as they represent only the records of mill shipments into states; they do not include the imports, which would increase the consumption in certain states near the Canadian border and the seaboard, nor do they make allowance for a variable but considerable stock of cement at all times in transit, in warehouses at distributing points.

The commercial capacity for production of finished portland cement of the 156 plants active at the end of 1928, and of three plants idle in 1928 but producing within the two previous years, according to manufacturers' reports supplemented by a few estimates, was 243,252,000 bbls. This total includes besides increased capacity due to extensions and improvements at old plants approximately 3,900,000 bbls. capacity for finished portland cement of four new plants that began operating during the year and are located one each in Maine, Pennsylvania, Tennessee, and Washington. The total production for the year 1928 was 72.4% of the indicated capacity at the close of the year. The corresponding figure for 1927 from the producers' reports was 76.3%.

PORTLAND CEMENT MANUFACTURING CAPACITY OF THE UNITED STATES, BY COMMERCIAL DISTRICTS, 1928

| District | Estimated capacity (barrels) | Percentage of capacity utilized |
|---|---|---|
| Eastern Penn., N. J. and Md. | 50,945,000 | 77.9 |
| New York and Maine* | 17,037,000 | 67.4 |
| Ohio, West'n Penn., W. Va. | 24,671,000 | 74.3 |
| Michigan | 19,508,000 | 71.0 |
| Wis., Ill., Ind. and Ky. | 26,607,000 | 85.5 |
| Va., Tenn., Ala., Ga., Fla. and Louisiana | 24,667,000 | 64.7 |
| East'n Mo., Ia., Minn., S. D. | 22,993,000 | 72.6 |
| West'n Mo., Neb., Kan., Okla. | 14,598,000 | 74.9 |
| Texas | 7,700,000 | 82.4 |
| Colorado, Montana and Utah | 5,567,000 | 49.8 |
| California | 22,700,000 | 59.3 |
| Oregon and Washington | 6,259,000 | 63.3 |
| | 243,252,000 | 72.4 |

*Maine began producing in April, 1928.

A summary of the monthly estimates of output of portland cement in 1928, compiled from the monthly reports of producers, was published early in January, 1929, by the Bureau of Mines and in Rock Products, February 2, 1929. These estimates, which indicated a production of 175,968,000 barrels and shipments of about 175,455,000 bbls., were within 0.1% and 0.2%, respectively, of the figures for 1928 here presented.

In addition to the imports shown in the

PORTLAND CEMENT PRODUCED, SHIPPED, AND IN STOCK IN THE UNITED STATES, 1927 AND 1928, BY STATES

| State | Active plants 1927 | Active plants 1928 | Production Barrels 1927 | Production Barrels 1928 | Increase or decrease 1928 (per cent) | Shipments 1927 Barrels | Shipments 1927 Value | Shipments 1928 Barrels | Shipments 1928 Value | Average factory value per barrel 1927 | Average factory value per barrel 1928 | Increase or decrease in quantity 1928 (per cent) | Stock (Dec. 31) Barrels 1927 (revised) | Stock (Dec. 31) Barrels 1928 | Increase or decrease 1928 (per cent) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alabama | 6 | 6 | 7,564,863 | 6,749,202 | —11 | 7,313,494 | $ 10,615,428 | 6,696,684 | $ 8,233,872 | $1.45 | $1.23 | — 8 | 655,024 | 707,542 | + 8 |
| California | 12 | 12 | 14,580,654 | 13,452,221 | — 8 | 14,433,153 | 26,623,396 | 13,596,493 | 25,552,069 | 1.84 | 1.88 | — 6 | 840,506 | 696,234 | —17 |
| Illinois | 4 | 4 | 7,017,047 | 7,334,833 | + 5 | 7,061,240 | 11,312,783 | 7,405,667 | 11,602,848 | 1.60 | 1.57 | + 5 | 768,275 | 697,441 | — 9 |
| Iowa | 5 | 6 | 5,415,144 | 7,070,172 | +31 | 5,661,234 | 9,124,405 | 6,880,731 | 10,734,838 | 1.61 | 1.56 | +22 | 1,370,481 | 1,559,922 | +14 |
| Kansas | 7 | 7 | 6,180,255 | 6,574,219 | + 6 | 6,141,937 | 9,939,412 | 6,787,568 | 10,091,330 | 1.62 | 1.49 | +11 | 1,137,286 | 923,937 | —19 |
| Michigan | 15 | 14 | 13,965,241 | 13,848,561 | — 8 | 13,708,259 | 20,858,202 | 14,044,230 | 19,628,495 | 1.52 | 1.40 | + 3 | 2,206,202 | 2,010,533 | — 9 |
| Missouri | 5 | 5 | 6,778,384 | 7,881,118 | +16 | 6,929,229 | 11,117,047 | 7,943,367 | 12,367,018 | 1.60 | 1.56 | +15 | 957,053 | 894,804 | — 7 |
| Ohio | 10 | 10 | 8,853,869 | 9,233,033 | + 4 | 8,727,879 | 14,242,901 | 9,364,338 | 14,928,183 | 1.63 | 1.59 | + 7 | 1,205,379 | 1,074,074 | —11 |
| Pennsylvania | 25 | 26 | 43,732,278 | 41,522,401 | — 5 | 42,909,513 | 66,711,069 | 41,161,019 | 62,572,588 | 1.55 | 1.52 | — 4 | 5,868,169 | 6,229,551 | + 6 |
| Tennessee | 5 | 6 | 4,430,439 | 4,689,703 | + 6 | 4,343,337 | 6,580,732 | 4,634,280 | 6,322,213 | 1.52 | 1.36 | + 7 | 515,245 | 570,668 | +11 |
| Texas | 7 | 7 | 5,655,835 | 6,345,604 | +12 | 5,692,350 | 10,232,908 | 6,231,083 | 10,938,646 | 1.80 | 1.76 | +10 | 407,403 | 521,924 | +28 |
| Other states* | 52 | 53 | 49,032,504 | 51,494,421 | + 5 | 48,943,103 | 81,496,364 | 50,989,514 | 82,913,802 | 1.67 | 1.63 | + 4 | 6,526,359 | 7,031,266 | + 8 |
| | 153 | 156 | 173,206,513 | 176,195,488 | + 2 | 171,864,728 | $278,854,647 | 175,734,974 | $275,885,902 | $1.62 | $1.57 | + 2 | 22,457,382 | 22,917,896 | + 2 |

*Includes Colorado, Florida, Georgia, Indiana, Kentucky, Louisiana, Maine, Maryland, Minnesota, Montana, Nebraska, New Jersey, New York, Oklahoma, Oregon, South Dakota, Utah, Virginia, Washington, West Virginia, and Wisconsin.

PORTLAND CEMENT PRODUCED, SHIPPED, AND IN STOCK IN THE UNITED STATES, 1927 AND 1928, BY DISTRICTS

| District | Active plants 1927 | Active plants 1928 | Production Barrels 1927 | Production Barrels 1928 | Increase or decrease 1928 (per cent) | Shipments 1927 Barrels | Shipments 1927 Value | Shipments 1928 Barrels | Shipments 1928 Value | Average factory value per barrel 1927 | Average factory value per barrel 1928 | Increase or decrease in quantity 1928 (per cent) | Stock (Dec. 31) Barrels 1927 (revised) | Stock (Dec. 31) Barrels 1928 | Increase or decrease 1928 (per cent) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Eastern Penn., N. J. and Maryland | 24 | 25 | 42,687,200 | 39,677,010 | — 7 | 41,656,489 | $ 64,614,336 | 39,738,910 | $ 60,236,388 | $1.55 | $1.52 | — 5 | 5,471,989 | 5,410,089 | — 1 |
| New York & Maine* | 11 | 12 | 10,775,375 | 11,484,054 | + 7 | 10,531,092 | 16,380,090 | 11,357,052 | 17,386,416 | 1.56 | 1.53 | + 8 | 1,528,718 | 1,655,720 | + 8 |
| Ohio, Western Penn. and West Virginia | 18 | 18 | 17,339,199 | 18,326,478 | + 6 | 17,202,341 | 27,638,726 | 18,037,131 | 28,375,472 | 1.61 | 1.57 | + 5 | 2,571,795 | 2,861,142 | +11 |
| Michigan | 15 | 14 | 13,965,241 | 13,848,561 | — 8 | 13,708,259 | 20,858,202 | 14,044,230 | 19,628,495 | 1.52 | 1.40 | + 3 | 2,206,202 | 2,010,533 | — 9 |
| Wis., Ill., Ind., Ky. | 11 | 11 | 22,022,150 | 22,748,604 | + 3 | 22,394,739 | 36,274,654 | 22,627,309 | 35,575,358 | 1.62 | 1.57 | + 1 | 2,614,241 | 2,735,536 | + 5 |
| Va., Tenn., Ala., Ga., Fla. and La. | 18 | 19 | 16,016,154 | 15,949,537 | — 4 | 15,530,338 | 23,668,315 | 15,770,338 | 21,253,288 | 1.52 | 1.35 | + 2 | 1,680,032 | 1,859,231 | +11 |
| Eastern Mo., Iowa, Minn. and S. D. | 11 | 12 | 14,358,201 | 16,692,696 | +16 | 14,566,818 | 23,325,158 | 16,544,026 | 25,777,858 | 1.60 | 1.56 | +14 | 2,731,067 | 2,879,737 | + 5 |
| Western Mo., Nebr., Kan. and Okla. | 11 | 11 | 10,092,888 | 10,938,637 | + 8 | 10,250,532 | 16,809,793 | 11,221,802 | 17,444,193 | 1.64 | 1.55 | +10 | 1,629,230 | 1,346,065 | —17 |
| Texas | 7 | 7 | 5,655,835 | 6,345,604 | +12 | 5,692,350 | 10,232,908 | 6,231,083 | 10,938,646 | 1.80 | 1.76 | +10 | 407,403 | 521,924 | +28 |
| Colo., Mont., Utah | 8 | 7 | 2,179,241 | 2,771,863 | +27 | 2,293,514 | 4,692,136 | 2,628,003 | 5,696,187 | 2.05 | 2.17 | +15 | 380,450 | 524,310 | +38 |
| California | 12 | 12 | 14,580,654 | 13,452,221 | — 8 | 14,433,153 | 26,623,396 | 13,596,493 | 25,552,069 | 1.84 | 1.88 | — 6 | 840,506 | 696,234 | —17 |
| Oregon and Wash. | 7 | 8 | 3,534,375 | 3,960,223 | +12 | 3,605,103 | 7,736,933 | 3,938,597 | 8,021,532 | 2.15 | 2.04 | + 9 | 395,749 | 417,375 | + 6 |
| | 153 | 156 | 173,206,513 | 176,195,488 | + 2 | 171,864,728 | $278,854,647 | 175,734,974 | $275,885,902 | $1.62 | $1.57 | + 2 | 22,457,382 | 22,917,896 | + 2 |

*Maine began producing in April, 1928; shipping in May, 1928.

following tables there are also reported "imported for consumption, white nonstaining portland cement": in 1927, 15,800 bbl., valued at $50,657; in 1928, 16,308 bbl., valued at $44,445.

SHIPMENTS OF DOMESTIC PORTLAND CEMENT FROM MILLS INTO STATES AND PER CAPITA, 1927 AND 1928, IN BARRELS*

| State | 1927 Total | 1927 Per capita* | 1928 Total | 1928 Per capita* |
|---|---|---|---|---|
| Alabama | 2,264,576 | 0.89 | 2,946,905 | 1.15 |
| Arizona † | 562.460 | 1.23 | 692.729 | 1.46 |
| Arkansas† | 855,051 | .44 | 1,251,341 | .64 |
| California | 13,128,911 | 2.96 | 12,356.292 | 2.71 |
| Colorado | 1,002,396 | .93 | 1,064,302 | .98 |
| Connecticut† | 2,061,892 | 1.26 | 2,283,726 | 1.37 |
| Delaware† | 342,905 | 1.41 | 348,719 | 1.43 |
| District of Columbia† | 981,732 | 1.82 | 889,541 | 1.61 |
| Florida | 2,482,725 | 1.82 | 1,325,201 | .94 |
| Georgia | 1,904.685 | .60 | 1,742,266 | .54 |
| Idaho† | 311,226 | .58 | 294,925 | .54 |
| Illinois | 14.832.550 | 2.03 | 17,676,964 | 2.39 |
| Indiana | 5,738,557 | 1.82 | 5,274,423 | 1.66 |
| Iowa | 3,708.471 | 1.53 | 5,348,807 | 2.20 |
| Kansas | 2,432,055 | 1.33 | 2,341.459 | 1.28 |
| Kentucky | 1,953.629 | .77 | 1,739,053 | .68 |
| Louisiana | 1,490,560 | .77 | 1,274,387 | .65 |
| Maine‡ | 505,952 | .64 | 522,573 | .66 |
| Maryland | 2,651,700 | 1.66 | 2,242,316 | 1.39 |
| Massachusetts† | 2,820,132 | .66 | 2,915,928 | .68 |
| Michigan | 11,576.188 | 2.58 | 11,775.822 | 2.56 |
| Minnesota | 3,380,002 | 1.26 | 3,054.582 | 1.12 |
| Mississippi† | 980,891 | .55 | 1,128,613 | .63 |
| Missouri | 4,207 151 | 1.20 | 4,717.741 | 1.34 |
| Montana | 307,968 | .43 | 461,299 | .84 |
| Nebraska | 1,360.032 | .97 | 1,195,650 | .85 |
| Nevada† | 87,276 | 1.13 | 106,321 | 1.37 |
| New Hamp.† | 459,706 | 1.01 | 515,317 | 1.13 |
| New Jersey | 8,419.323 | 2.25 | 8,436.886 | 2.21 |
| New Mexico† | 278.528 | .71 | 333,250 | .84 |
| New York | 23,002,585 | 2.01 | 22,320.713 | 1.93 |
| North Carolina† | 3,213,314 | 1.11 | 2,400.601 | .82 |
| North Dakota† | 392.730 | .61 | 454,873 | .71 |
| Ohio | 10,342,424 | 1.54 | 11,013,338 | 1.61 |
| Oklahoma | 3,119.565 | 1.31 | 3,125,602 | 1.29 |
| Oregon | 1,399.167 | 1.57 | 1,255.925 | 1.39 |
| Pennsylvania | 13,837,359 | 1.42 | 12,996,494 | 1.32 |
| Rhode Island† | 700.851 | 1.00 | 760.813 | 1.06 |
| South Carolina† | 985,874 | .53 | 1,508,279 | .81 |
| South Dakota | 409.820 | .59 | 491,102 | .70 |
| Tennessee | 2,262.697 | .91 | 2,697.996 | 1.08 |
| Texas | 5,437.907 | 1.01 | 6,193,925 | 1.13 |
| Utah | 428.469 | .82 | 507,666 | .96 |
| Vermont† | 393,294 | 1.12 | 605,930 | 1.72 |
| Virginia | 1,799,062 | .71 | 1,993,581 | .77 |
| Washington | 2,574,293 | 1.65 | 2,972.167 | 1.87 |
| West Virginia | 1,561,978 | .92 | 1,360.192 | .79 |
| Wisconsin | 5,553,176 | 1.90 | 5,380.070 | 1.82 |
| Wyoming† | 181.103 | .75 | 197.144 | .80 |
| Unspecified | 51,818 | ..... | 83,869 | ..... |
| | 170,736,616 | 1.44 | 174,577,618 | 1.45 |
| Exports reported by manufacturers but not included above§ | 1,128,112 | ..... | 1,157,356 | ..... |
| Total shipped from cement plants | 171,864,728 | ..... | 175,734,974 | ..... |

*Per capita figures based on estimate of population made by the Bureau of the Census.
†Non-cement-producing state.
‡Maine began producing April, shipping May, 1928.
§Includes shipments to Alaska, Hawaii and Porto Rico.

IMPORTS OF HYDRAULIC CEMENT IN 1927 AND 1928, BY DISTRICTS

| District | 1927 Barrels | 1927 Value | 1928 Barrels | 1928 Value |
|---|---|---|---|---|
| Alaska | 5 | $ 25 | ..... | ..... |
| Florida | 308,682 | 420,286 | 72,806 | $ 91,548 |
| Galveston | 18,328 | 24,908 | 105,637 | 137,691 |
| Georgia | 20,000 | 30,080 | ..... | ..... |
| Hawaii | 37,326 | 61,356 | 37,444 | 47,438 |
| Los An. | 11,278 | 18,770 | 15,188 | 28,780 |
| Me. & N. H. | 42,602 | 72,179 | 50,335 | 98,862 |
| Maryland | 506 | 809 | 4,166 | 3,555 |
| Massa. | 481,541 | 649,686 | 470,340 | 660,914 |
| New Or. | 55,031 | 80,925 | 15,584 | 20,246 |
| New York | 39,423 | 67,317 | 222.833 | 302,259 |
| No. Car. | ..... | ..... | 177,260 | 238,586 |
| Ohio | ..... | ..... | 2 | 12 |
| Oregon | 31.620 | 43,269 | 70,728 | 87,583 |
| Philadel. | 305,920 | 425,485 | 167,522 | 237,523 |
| Porto R. | 319,653 | 511.399 | 324,186 | 432,954 |
| Rhode Is. | 80,156 | 108,627 | 54,036 | 71,016 |
| Sabine | 8,000 | 15,500 | 6,420 | 13,564 |
| St. Law. | 16,242 | 38,632 | 1,510 | 2,894 |
| San An. | ..... | ..... | 15,000 | 17,700 |
| San. Fran. | 38,007 | 50,431 | 380 | 725 |
| So. Car. | 196,571 | 279,801 | 413,055 | 516,084 |
| Vermont | 1,518 | 2,293 | 974 | 1,378 |
| Virginia | 5,974 | 9,666 | 1,200 | 1.328 |
| Wash. | 31,803 | 45,007 | 57,479 | 78,220 |
| | 2,050,180 | $2,956,451 | 2,284,085 | $3,090,860 |

***Imports and Exports****

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS IN 1928

| Imported from | District into which imported | Barrels | Value Dollars |
|---|---|---|---|
| Belgium | Florida | 72,806 | 91,548 |
| | Galveston | 93,637 | 121,906 |
| | Hawaii | 37,444 | 47,438 |
| | Los Angeles | 6,100 | 7,326 |
| | Me. & N. H. | 15,000 | 20,313 |
| | Massachusetts | 470,090 | 660,497 |
| | New Orleans | 15,584 | 20,246 |
| | New York | 114,581 | 147,369 |
| | No. Carolina | 177,160 | 238,586 |
| | Ohio | 1 | 4 |
| | Oregon | 67,567 | 84,044 |
| | Philadelphia | 138,692 | 200,366 |
| | Porto Rico | 705 | 1,260 |
| | Rhode Island | 54,036 | 71,016 |
| | Sabine | 6,420 | 13,564 |
| | San Antonio | 15,000 | 17,700 |
| | So. Carolina | 383,055 | 480,904 |
| | Virginia | 1,200 | 1,328 |
| | Washington | 57,479 | 78,220 |
| | Total | 1,726,557 | 2,303,635 |
| Canada | Me. & N. H. | 35,335 | 78,549 |
| | St. Lawrence | 1,510 | 2,894 |
| | San Francisco | 2 | 6 |
| | Vermont | 974 | 1,378 |
| | Total | 37,821 | 82,827 |
| Denmark | New York | 36,326 | 38,000 |
| | Oregon | 3,000 | 3,205 |
| | Porto Rico | 299,398 | 401,301 |
| | Total | 338,724 | 442,506 |
| France | Los Angeles | 2 | 15 |
| | New York | 10,261 | 25,983 |
| | Oregon | 13 | 30 |
| | Total | 10,276 | 26,028 |
| Germany | Los Angeles | 8,786 | 20,814 |
| | Massachusetts | 250 | 417 |
| | New York | 234 | 342 |
| | Philadelphia | 6 | 39 |
| | Total | 9,276 | 21,612 |
| Hungary | Philadelphia | 10 | 31 |
| Irish Free State | New York | 3 | 34 |
| Italy | New York | 5 | 14 |
| Norway | Philadelphia | 7,069 | 8,006 |
| | Porto Rico | 24,183 | 30,393 |
| | San Francisco | 75 | 76 |
| | So. Carolina | 30,000 | 35,180 |
| | Total | 61,327 | 73,655 |
| Poland and Danzig | Maryland | 4,166 | 3,555 |
| Sweden | New York | 1 | 8 |
| United Kingdom | Galveston | 12,000 | 15,785 |
| | Los Angeles | 300 | 625 |
| | New York | 61,422 | 90,509 |
| | Ohio | 1 | 8 |
| | Oregon | 148 | 304 |
| | Philadelphia | 21,745 | 29,081 |
| | San Francisco | 303 | 643 |
| | Total | 95,919 | 136,955 |
| | Grand total | 2,284,085 | 3,030,860 |

*Compiled from records of the Bureau of Foreign and Domestic Commerce and subject to revision.

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES IN 1927 AND 1928

| Exported to— | 1927 Barrels | 1927 Value | 1928 Barrels | 1928 Value |
|---|---|---|---|---|
| Canada | 24.103 | $ 112.741 | 39.927 | $ 202,628 |
| Cen. Amer. | 120,179 | 356.911 | 125,718 | 370,219 |
| Cuba | 107,020 | 279,957 | 99,907 | 256,201 |
| Other W.In.& Bermuda | 68,637 | 162,225 | 57,382 | 145,759 |
| Mexico | 78,516 | 254,214 | 77,676 | 250,371 |
| So. Amer. | 352,892 | 1,250.258 | 342,546 | 1,240,132 |
| Other coun. | 65,379 | 380,411 | 81,500 | 473,392 |
| | 816,726 | $2.796,717 | 824,656 | $2.938.702 |

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII AND PORTO RICO IN 1927-28*

| | 1927 Barrels | 1927 Value | 1928 Barrels | 1928 Value |
|---|---|---|---|---|
| Alaska | 19,517 | $ 59,815 | 13,838 | $ 41.430 |
| Hawaii | 296.639 | 710,730 | 291,305 | 681.468 |
| Porto Rico | 103,741 | 256,179 | 46,700 | 114,409 |
| | 419,897 | $1,026,724 | 351.843 | $ 837.307 |

*Compiled from records of the Bureau of Foreign and Domestic Commerce and subject to revision.

## Federal Aid Roads Completed Show High Total

A TOTAL of 78,096.6 miles of Federal aid road construction was completed, 9,526.3 miles were under construction, and 2,898.3 miles were approved for construction as of June 30, 1929, according to figures made public by the Bureau of Public Roads, of the Department of Agriculture.

The mileage under construction, the Bureau said, was estimated at a total cost of $238,158,495.57, and received a Federal aid allotment of $96,500,346.96. The mileage approved for construction was estimated to cost $61,500,673.97 and had a Federal aid allotment amounting to $24,137,546.45.

Texas has completed the greatest mileage, amounting to 6,064.2 miles, on June 30, the bureau declared. The three states following Texas in the amount of Federal aid road construction completed were Minnesota, 3,872.6 miles; North Dakota, 3,675.8 miles, and Nebraska, 3,628.2 miles completed.

Texas, the Bureau said, also had the greatest mileage, 911.1 miles, under construction on June 30, and came second with 312.3 miles in the amounts of mileage approved for construction, being exceeded in this latter category by North Dakota, which State had 356.6 miles, or the greatest amount of mileage approved for construction as of June 30.

New York led in the expense of roads under construction on Federal aid projects on June 30, the Bureau pointed out, with a total estimated cost of $23,451,671.43, followed by Illinois with projects estimated at $19,245,292.23, Texas at $17,723,807.68, and Pennsylvania at $12,854,654.57.

The first state in roadways under construction, New York, also led in the expense of Federal aid projects approved for construction, the total estimated costs for all the Federal aid projects approved in that state being $9,105,046.33, the bureau pointed out, followed by Texas with projects approved for construction at a total estimated cost of $7,000,086, Ohio at $4,310,036.60, and Pennsylvania at $3,619,350.36.

## Metallurgical Limestones

THE DEPARTMENT of Commerce, Bureau of Mines, has recently issued bulletin No. 299, by Oliver Bowles, on "Metallurgical Limestones: Problems in Production and Utilization." The 40-page booklet discusses limestone varieties, as a preliminary chapter, following which the author gives an able discussion of problems arising from the utilization of limestones, describing the purpose of fluxing stone both in blast furnace and basic open hearth practices.

The effect of impurities and various slagging effect are discussed. The latter chapters of the bulletin deal with problems of production. Copies may be secured for 10c. from the Superintendent of Documents, U. S. Government Printing Office, Washington.

## France Stone Acquires New Quarry Acreage

E. H FRANCE, said to be acting for the France Stone Co., Monroe, Mich., is reported to have purchased three farms in Bedford township, Monroe county, Michigan. The properties approximate 140 acres of land and are located on sections 20 and 21. Options on surrounding property are stated to have been taken. It is understood that large quarry operations will be located on the acquired properties.—*Toledo* (Ohio) *News-Bee.*

## H. H. Leh New General Manager of Keystone Portland

HOWARD H. Leh has resigned as superintendent of Nazareth, Penn. plant of the Lone Star Cement Co., to become general manager of the Keystone Portland Cement Co., Bath, Penn. Mr. Leh had been superintendent of the Nazareth plant for the past year or so and since it was purchased by the International Cement Corp. of New York. Prior to which time and for the past 10 years, he acted in the same capacity and at the same plant when it was known as the Phoenix Portland Cement Co. During that period he also was partly interested in the design and construction of several plants in the south.

Before assuming such duties on August 1, he was presented with a handsome watch and other useful and appropriate articles by the employes of the Nazareth plant as a remembrance of the high esteem they had for him.

Mr. Leh is also a director of the Limestone Products Corporation of America, who operate a lime plant near Newton, N. J.

## McGrath Company Purchases New Gravel Lands

THE McGrath Sand and Gravel Co. has acquired the rights to the gravel on the Phillip Hoffman property west of Mackinaw, Ill., and will investigate the possibilities of gravel on the farm as soon as equipment arrives. A new steam shovel has been ordered and work is expected to begin soon. The Hoffman properties consist of 160 acres. —*Peoria* (Ill.) *Journal.*

## R. C. Newhouse Visiting in Spain

WE HAVE just received a letter from R. C. Newhouse, chief engineer of the Allis-Chalmers Manufacturing Co., Milwaukee, who is now in Europe, combining business with a well earned vacation. Mr. Newhouse, writing from Toledo, Spain, speaks of the very interesting conditions he has seen in the cement mills of Europe. He has sent in a picture of the Villaluenga plant of the Compania General de Asfaltos Y Portland "Asland" at Toledo, Spain, which is reproduced herewith. This company, a valued subscriber to ROCK PRODUCTS, has equipped its plant with American machinery, principally of Allis-Chalmers make. It is ably managed by Senor Nin.

Mr. Newhouse expects to be back in the United States some time in September.

## Penn-Dixie Takes Option on Iowa Quarry Land

THE PENNSYLVANIA-Dixie Cement Corp., which about a year ago acquired the Pyramid Portland Cement Co. plant at Valley Junction, Iowa, has taken options on 500 acres of land near Earlham. The tract is underlaid with limestone and the company has started tests to determine thickness of the rock and the ledge overlying it. The site is near the Hawkeye Portland Cement Co. plant and the limestone is reported to be of excellent quality. If the tests are satisfactory the company will exercise the options at once and begin development.

## San Antonio Manufacturers Frolic on Local Cement Company's Lawn

THE BEAUTIFUL lawn of the San Antonio Portland Cement Co., at Cementville, Tex., was the scene of the recent annual mid-summer frolic of the Manufacturers' Association of San Antonio, attended by more than 200 members of the association and their families.

The guests were entertained by sleight-of-hand tricks for which purpose an illuminated stage was set up on the lawn and an old-fashioned barbecue. The Alamo brass band played during and after the repast. Souvenirs were presented to the men and women.

The event was concluded with a trip through the plant. Charles Baumberger, Jr., and Charles Baldus, vice president and treasurer, respectively of the San Antonio company, were the recipients of many congratulations from the guests upon the perfection with which the details of the mid-summer frolic was carried out by them and their assistants.—*San Antonio* (Tex.) *Express.*

## Norfolk Cement Mill Down for Indefinite Period

AFTER operating on a greatly reduced output with several shutdowns during the past winter and throughout the current year, the Norfolk, Va. mill of the Lone Star Cement Company Virginia, Inc., and its raw material operations at Chuckatuck will close down for an indefinite period on August 10, executives of the company announced recently. Low priced foreign cement admitted duty-free under the present tariff schedule was given as the reason.

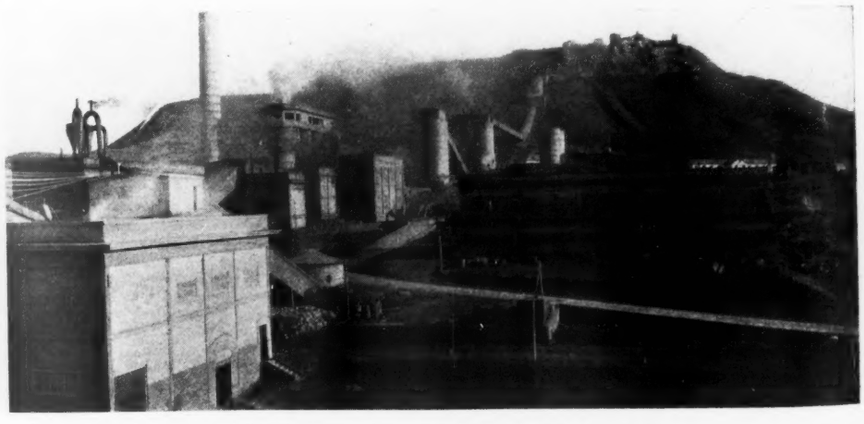
"We have kept our mills going just as long as we could provide storage space for the cement produced," Dwight Morgan, vice-president of the company said in explaining the shutdown. "We have operated at a reduced capacity for over a year in an effort to keep as many men as possible on the payroll over an extended period. Now we face the accumulated effect of the continued and extensive use of imported cement by highway contractors and industrial constructors in South Carolina, by the State of North Carolina for its highway work and the awarding of the Richmond, Va. city contract this year to foreign cement.

"At a time when normal building activity should keep our mills working to capacity to meet the demand we find our storage bins filled and therefore have no alternative."

Cheap labor and low transportation costs make it possible for the foreign manufacturer to offer his product in the seaboard territory at a lower price than the American manufacturer can meet, Mr. Morgan stated, and until American interests are successful in securing import duties on foreign cement, the situation will remain unchanged.

## Standard Rock to Build Plant

ACCORDING to recent reports, Standard Rock Co., Stockton, Calif., is planning installation of a rock-crushing plant with conveying, loading and other equipment to cost over $100,000. A stock issue of about $200,000 will be sold, part of the fund to be used for the new plant.



***The Villaluenga cement mill at Toledo, Spain***

## Missouri Gravel Completes New Plant

A NEW $100,000 gravel washing plant has just been completed and put in operation by the Missouri Gravel Co. at Reading station on the C., B. & Q. road five miles north of Louisiana, Mo. The plant, which is located on Salt river, will have a daily capacity of about 25 carloads of washed gravel, which will be used for road construction and other purposes.

The gravel is pumped out of the bed of the river to the river bank, where it is picked up by a steam shovel and loaded in cars and conveyed to a hopper at the washing plant. It is then elevated to the washers and screened, the various sizes going to storage bins. Water for washing purposes is pumped from the river.

A side track of a half mile in length was built from the side track at Reading station over which to move cars to handle the output of the plant. The side track passes under the hoppers of the washing plant.—*Quincy* (Ill.) *Herald.*

## Western Company to Open Gravel Plant Near Leesburg

THE WESTERN Indiana Gravel Co., Lafayette, Ind., plans to open a new plant on the old Hart Brown farm, just south of Leesburg, where a fine deposit of gravel has been located. Preparations are now being made for the installation of modern machinery for the separation of sand and gravel and washing of gravel. Shipments will be made over the Winona interurban line.

The surface of the gravel pit is now being stripped and the top ground delivered by interurban to the Gast Construction Co. for use as filler on the low places along State Road No. 15, which is now being paved. The Western company operates other sand and gravel plants at Lafayette, Terre Haute and Winona Lake, Ind.—*Warsaw* (Ind.) *Union.*

## Canada Gypsum Plans Further Expansion

IT IS RUMORED that negotiations have been concluded for the acquisition by Canada Gypsum and Alabastine, Ltd., of the Standard Lime Co. of Joliette, Que., which owns lime manufacturing plants at Joliette and St. Mark, Que., and in turn controls Lime Products, Ltd., which operates a sand-lime brick manufacturing plant at Montreal and also Standard Sand, Ltd., of Montreal, which operates a large sand pit at St. Felix, supplying material to the market in Montreal and vicinity.

The acquisition of the Standard Lime properties will round out Canada Gypsum's business, giving it a complete cover of the gypsum business from Vancouver to the Maritime Provinces, inclusive, and also a complete cover of the Canadian lime market both for lime products and chemical limestones from Windsor, Ont., to Quebec City, which is the most densely populated section of Canada.

The deal would make Canada Gypsum and important factor in the sand and sand-lime brick business in the province of Quebec.

Standard Lime, Ltd., has been a very profitable business for over 20 years. The volume of its business added to Canada Gypsum's will increase the latter's annual sales to around the $7,000,000 mark, and the addition of its profits to Canada Gypsum's will run this company's annual net earnings substantially over $1,000,000.

## Dewey Portland to Install Slurry Filters at Davenport

FURTHER improvements at its Davenport, Iowa, cement mill are announced by the Dewey Portland Cement Co. These include the installation of cement slurry filters, a clay wash mill, additional buildings and other new equipment. About $150,000 will be expended on this and other improvements made during this year, the report states. The plant is now producing about 5000 bbl. per day.

The Dewey company recently received the contract to furnish about 100,000 bbl. of cement for the new Hastings dam at Hastings, Minn.—*Davenport* (Iowa) *Democrat.*

## Russia to Have Large Modern Gravel Plant

PLANS HAVE been completed for a large new and modern-equipped gravel plant to be built near Leningrad, Russia. This plant is designed to furnish material in Leningrad and vicinity, much of the initial production going into the construction of a new 80,000 kw. hydro-electric plant which is to be built near Leningrad. It is claimed that the new gravel plant will be the largest of its kind outside of the United States.

Not only is this the first gravel washing plant of any magnitude ever shipped into Russia but it is unique in several respects. The material will be brought to it in hopper dump cars; and track hoppers are provided so that a whole trainload of material can be dumped at once into the plant without requiring manual handling. The outfit will consist of two complete, identical units and each unit will be capable of handling 300 cu. yd. of gravel per hour.

Contract for the equipment, which is to cost about $500,000, has been placed with the Smith Engineering Works, Milwaukee, Wis., by the Amtorg Trading Co. of New York. Shipments of machinery are expected to start about October 1.

## Canada Cement Buys Control in National Cement Co. of Canada

OFFICIAL announcement has been made by the Canada Cement Co., Ltd., Montreal, that it has acquired a controlling interest in the National Cement Co. of Canada by the purchase of the stock held by Alfred Rogers and associates of Toronto. All details of the transfer have been completed, the amount of stock changing hands being estimated at approximately 75% of the outstanding capital of the National company.

This move recalls the long and bitter price war which occurred between the two companies prior to the time the Canada Cement Co. was acquired by the Holt-Gundy group, following which National Cement was sold to Mr. Rogers, who had been identified with similar enterprises, notably the St. Marys Cement Co.

The National Cement Co.'s mill is located a short distance from one of the large plants of the Canada Cement Co. at Montreal East and to a very considerable extent can be operated by the same staff. The rock formation in the section of the island in which both plants are located is reported to be quite favorable for the manufacture of cement and as a result of this it is believed that both mills will gradualy be extended.

## Pacific Coast Aggregates to Lease Natomas Properties

ACCORDING to recent newspaper reports, unsupported by official confirmation, the Natomas Co., San Francisco, Calif., is said to have leased its rock crushing properties in northern California to the newly organized Pacific Coast Aggregates, Inc. (See ROCK PRODUCTS, August 3, for details about this company.)

The Natomas company is to receive $10,000 per month under the lease, the reports state, and, moreover, the terms give the Pacific company an option to purchase their properties for about $2,000,000.

## Producing New Cements

ANNOUNCEMENT was made recently that the Superior, Ohio, cement plant of the Wellston Iron Furnace Co. has gone into production on two new products. The new products are known as "Sticktite" and "Fast-Hard," the former being waterproof stucco cement and "Fast-Hard" a rapid-hardening cement.

The company has also started a weekly broadcasting program over WLW in Cincinnati—*Portsmouth* (Ohio) *Times.*

## Canadian Fuel Report

THE SECOND PROGRESS report of 1923-28 reviews the work of the board during these years; states the present fuel situation, and shows the possibilities that are opening by investigation and research.

# Foreign Abstracts and Patent Review

**The Question of the Combustion Process in Automatic Shaft Kilns**—A. Hauenschild answers Dr. H. Kuehl's statement in *Zement 22*, on the combustion results due to direct diffusion by the oxygen of the air and his doubt that the principal combustion of the fuel takes place according to the formula C plus $CO_2 = 2CO$. This reaction, states Hauenschild, is the basis of the blast furnace process, the gas generator, etc., and he shows that it occurs also in the shaft kiln, realizing at the same time that considerable difficulty is encountered in approaching this problem on a purely scientific basis due to the many reactions taking place simultaneously in the kiln, as, for example, the formation of calcium silicates, calcium aluminates, etc.—*Zement* (1928) **17,** 34, pp. 1271-73.

**Protection of Concrete**—A. W. Rick reviews the action of acids and salts on cement in concrete construction and describe admixtures, impregnations and coatings for protecting concrete.—*Tonindustrie-Zeitung* (1928) **52, 93,** pp. 1861-63.

**Gypsum Plasters and Limes.** Tate briefly surveys the history of plaster of paris, high calcium limes, Keene's or French or English cement and other products for plaster purposes, covering all ages and countries sharing in the development to the present state.—*Rev. des. Mater. de Const. et de Trav. Pub.* (1928) **231,** 467-469.

**Action of Sea Water and Pure Water Upon Mortar and Concrete**—According to Magnard's work, "The Pathology of Reenforced Concrete," ordinary cements in setting liberate lime, which dissolves in the surrounding water and reacts with $MgSO_4$ to form $CaSO_4$. This process continues until all silicates, aluminates and ferric combinations of the lime have become monobasic. No proof of the entrance of $MgSO_4$ into the concrete is determinable; but on the other hand, NaCl enters in larger quantities into the cement and undergoes changes there which result in the formation of a still unknown salt. After the formation of $Ca(OH)_2$ has stopped, $MgSO_4$ can also enter the pores and act upon the CaO of the monobasic combinations, whereby MgO is precipitated and fills all the intermediate spaces. $SiO_2$, $Al_2O_3$, and $Fe_2O_3$ hydrate with an increase of volume. These in association with the silica products formed by the action of the NaCl, destroy the cementing action further.

In pure water, the absence of carbonic acid leads to deterioration of the concrete, for this compound if present would convert the $Ca(OH)_2$ already inside the concrete into $CaCO_3$, which would fill all pores. In running water, the lime hydrate is carried off. It is suggested to use well-burned cement; mix as solid as possible but sufficiently porous for the expansion of $Ca(OH)_2$; initial storage of 1 to 2 months in the air; covering with tar, pitch or paraffin. Alumina cement and fused cements are quite resistant to pure water, but even they fail in time.—*Industrie del Cemento* (1928) **25,** 52-53.

**Dolomites and Magnesite**—The chemical compositions and other data on magnesites and dolomites are given.—*Revue des Materiaux de Construction et de Travaux Publics,* **225,** 220-221.

**Early-High Strength Cements**—E. Rengade discusses the history, composition, mechanical strengths, chemical resistance, setting heat, shrinkage, applications and the problems concerned with the applications of early high strength cements.—*Revue des Materiaux de Construction et de Travaux Publics* (1928) **225,** 203-08.

**Puzzuolanic Materials in the Manufacture of Cements**—Ed. Marcotte gives Rebuffet's analysis of a Roman puzzolanic concrete over 2000 years old and of a modern Italian puzzolanic concrete as follows:

| | Roman Mortar | Italian Mortar |
|---|---|---|
| $H_2O$ | 17.03 | 20.56 |
| $CO_2$ | 1.11 | 1.48 |
| $SiO_2$ | 33.64 | 32.60 |
| $Al_2O_3$ | 32.61 | 28.38 |
| CaO | 5.66 | 6.67 |
| $Fe_2O_3$ | 1.68 | 4.23 |
| MgO | 3.56 | 2.35 |
| $K_2O$ and $Na_2O$ | 5.15 | 2.86 |

Of the Roman mortar, 33.68% remained insoluble and of the Italian mortar 52.10% on treatment with hydrochloric acid. The chemical change which enabled this mortar to resist action of sea water for over 2000 years was attributable to the reduction of lime. This action was accelerated in the laboratory by the use of sodium chloride, magnesia sulphate and of carbon dioxide.

Various materials employed for puzzolanic cements are described; these include trass, calcined clay, blast furnace slags, various puzzuolana deposits. On the special cements the author deals with the replacement of silicic acid by other acids, of alumina by iron, of lime by magnesia and also replacement of lime by other bases. The physical and physical-chemical characteristics of cement are discussed with special treatment of the action of sea water, in which the works of Dr. W. Michaelis, Magnard, Rebuffat and Camerman reviewed.

A special section is devoted on the use of "gaize" for puzzolanic cement. This material is a siliceous, argillaceous, porous soft rock containing a good proportion of soluble silicate. The average composition is:

CHEMICAL COMPOSITION OF GAIZE

| | Raw Material | Calcined Material |
|---|---|---|
| $SiO_2$ | 80.0% | 85.0%* |
| $Al_2O_3$ | 7.0 | 7.5 |
| $Fe_2O_3$ | 3.0 | 3.0 |
| CaO | 2.0 | 2.0 |
| MgO | 1.0 | 1.0 |
| $SO_3$ | 0.5 | 0.3 |
| Loss on ignition | 6.0 | 0.5 |
| Undetermined | 0.5 | 0.7 |
| | 100.0% | 100.0% |

*Of which 52% is insoluble.

The most favorable calcining temperature is about 900 deg. C. (1652 deg. F.). Tensile and compressive strengths of 1:3 test samples were as follows: After 10-year storage in sea water (50% cement and 50% dried gaize) 28.6 kg./cm.² and 220 kg./cm.²; (50% cement and 50% burned gaize) 37.4 kg./cm.² and 235.3 kg./cm.², (70% portland cement rock from rotary kiln and 30% burned gaize) 39.7 kg./cm². and 230 kg./cm². In manufacturing the cement, the mix is made up with two parts of clinker to one part of roasted gaize, the clinker coming from a burn which used 22% of clay in the raw mix. The two materials are ground together to a 13 to 15% residue on the 4900 mesh (metric) screen. The initial set is at 2 hrs. and 30 min. and the final after 4 hr. and 50 min. These properties may be slowed by adding a slight quantity of gypsum. An average chemical analysis of the final product is:

| | |
|---|---|
| $SiO_2$ | 43.0% |
| $Al_2O_3$ | 7.0 |
| $Fe_2O_3$ | 3.0 |
| CaO | 43.0 |
| MgO | 1.0 |
| $SO_3$ | 1.0 |
| Loss on ignition | 2.0 |
| | 100.0% |

—*Mines, Carrieres, Grandes Enterprises* (1928) **7,** 72, 129-38.

**Marguerre Waste Heat Plant at the Saale Portland Cement Co.**—L. Eck describes the installation of a Marguerre waste heat steam-generating plant in limited space back of the rotary kiln at the Saale Portland Cement Co., Granau, Germany. The process utilizes water repeatedly placed under pressure and heated in a unit which consists of a circulating economizer, a preheater for the condensate from the turbine, and a superheater. The water is in part evaporated by lowering pressure under saturation temperature and the non-evaporated water returned to the pump. This installation relieves the brown-coal fired power plant of part of its load by utilization of the waste heat.—*Zement* (1928) **17, 44,** 1611-14; **45,** 1644-46.

**Packing of Cement**—The dry cement is compressed into a solid block and wrapped in paper.—*British Patent No.* 307,970.

**Cement Kiln**—A new type of kiln is described. A vertical kiln is heated by four burners (coal, oil, etc.) at the bottom. The raw material in the form of powder or slurry is projected from jets placed below the burners through and upward with the flames. The velocity of the hot gases is adjusted so that the spray is kept suspended until drying and clinkering is complete. The consequent increase in density causes the particles to fall back through the flames and collect in the bottom of the kiln. The waste heat of the gases and clinker is utilized by boilers or for preheating the air. The flame temperature and gas velocity are adjusted so that the material is suspended sufficiently long to attain the clinkering temperature of 1400 deg. C. The flames may be given a swirling motion to concentrate them at the bottom of the kiln. The clinker produced is already in a fine state of division and facilitates subsequent grinding.—*British Patent No.* 307,763.

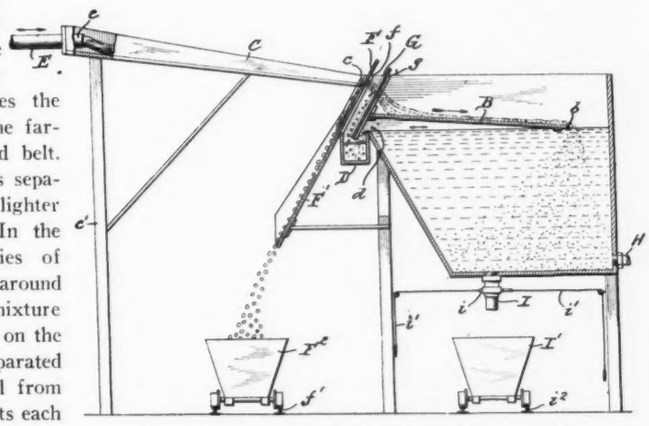
**Silica-Containing Adsorbants** — Waterglass dissolved in water or dilute sugar cane molasses is treated with a milk of lime solution and then the whole saturated with $CO_2$ gas, care being taken to keep the reaction alkaline. The resulting precipitate separates out, is washed and finally dried; it has the adsorption properties of silica gel made in other ways.—*G. E. Van Nes, U. S. Patent No.* 1,715,439.

## Recent Process Patents

*The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.*

**Dry Separation.** A dry process of separating coal from slate might have an application in the rock products industry, especially where it was desired to separate flat pieces from round pieces. It depends upon the fact that where one conveyor discharges to another at right angles the rounder pieces go to the farther side of the second belt. In the case of coal this separation is aided by the lighter weight of the coal. In the invention cited a series of belts is used running around a square frame. The mixture of coal and slate starts on the lower belt and the separated products are discharged from the upper belt. The belts each have a loop on the under side which dips into a tank of water, as wetting the belt causes the flat pieces to adhere to it more strongly than the fine pieces that may have been carried over.

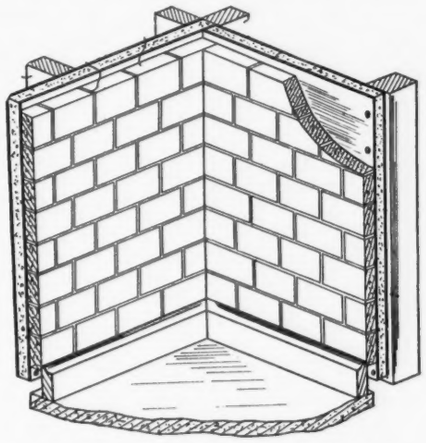
A scraper on this loop removes any round pieces and this aids the separation.



***Dry process of separating flats from rounds***

*T. Katayama.* March 12, 1929. U. S. Patent, No. 1,705,456.

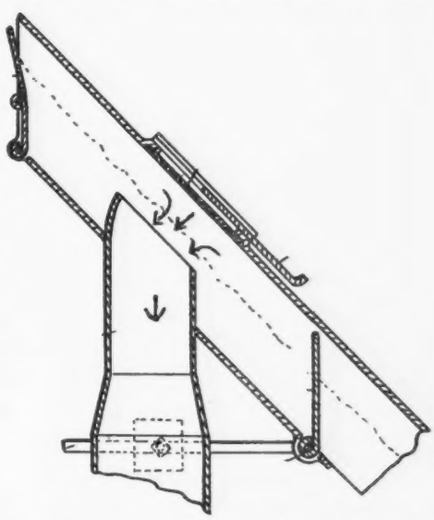
**Wallboard and Tile Plaster Board**—This rather novel wallboard specialty consists of a back or base of gypsum plaster board to which are cemented tile, preferably glazed, although the patent covers any suitable tile. The base and tile facing are made up in sections of convenient size with a blank space left at suitable places for nailing to the studding, after which individual tiles can be cemented in this blank space, giving a continuous surface. *Theodore E. Knowlton, assignor to Certain-Teed Products Corp.,* U. S. Patent No. 1,701,454.



***Novelty wallboard and tile plaster board***

**Colored Dolomite Cements**—The patent relates to a method of preparing either colored or uncolored dolomite cements by regulating the calcining temperatures at a comparatively low point, resulting in the magnesium carbonate being transformed to the oxide, leaving the calcium carbonate unaltered. This produces a product which when leached or otherwise contacted with water does not hydrate, making it possible to treat the calcine with a suitable water soluble dye. The method of calcining and leaching is described in considerable detail, but in essence is as above outlined. The dyes in the colored cement as above prepared is not stable, so it is necessary to add a reagent to fix or stabilize this color, and the patentee uses magnesium chloride for this purpose. He is well aware of the use of this salt with MgO to produce the well-known Sorel cement, and makes no claims covering that point, but does adopt this chemical to render the great class of soluble coal tar dyes insoluble, and thus protect them from destruction from any caustic action resulting from the setting reactions. The patentee claims that colored cement products produced from this cement, if covered with soot or otherwise tarnished, can be cleaned with an acid wash without injury to the original. Some dolomites, due to the presence of silicates, etc., do not lend themselves to making this cement, these dolomites, and the effect of iron and other impurities are outlined.—*Frederick W. Brown,* U. S. Patent No. 1,682,479.

**Dust Removal Apparatus**—This patent describes a method of removing dust from crushed stone especially, although the patent covers other fields of use besides that industry. The author of the patent describes his apparatus which consists of a fan suction pipe so placed in the top of a chute that any stone passing down the chute passes in front of this opening. To further insure removal of dust from the stone an adjustable slot is made in the bottom of the chute directly opposite the fan suction so the air passes through the moving stone and not merely over it. Vertically-hanging swinging doors are placed in the chute, both above and below the adjustable slot, so that the effective air is confined to a relatively small area.—*F. J. Colgan, U. S.* Patent No. 1,699,180.



***Device to remove dust from crushed stone***

**Mica Separating Machine**—A mica treating machine comprising a foraminous traveling belt, means for causing a block of mica to adhere to it, and means for exerting an outward pull on the outward lamination of the block.—*L. T. Frederick,* U. S. Patent No. 1,722,082.

# Traffic and Transportation

## Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly car loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

| | Limestone Flux Week ended | | Sand, Stone and Gravel Week ended | |
|---|---|---|---|---|
| District | July 13 | July 20 | July 13 | July 20 |
| Eastern | 3,922 | 4,113 | 17,374 | 18,460 |
| Allegheny | 4.097 | 4,057 | 10,114 | 10,776 |
| Pocahontas | 599 | 412 | 1,223 | 1,485 |
| Southern | 543 | 654 | 10,660 | 11,125 |
| Northwestern | 1,741 | 1,617 | 10,258 | 10,454 |
| Central western | 481 | 475 | 14,051 | 14,210 |
| Southwestern | 440 | 393 | 8,291 | 8,153 |
| Total | 11,823 | 11,721 | 71,971 | 74,663 |

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1928 AND 1929

| | Limestone Flux | | Sand, Stone and Gravel | |
|---|---|---|---|---|
| | 1928 | 1929 | 1928 | 1929 |
| | Period to date | | Period to date | |
| District | July 21 | July 20 | July 21 | July 20 |
| Eastern | 76,666 | 91,080 | 235,861 | 247,198 |
| Allegheny | 90,711 | 97,786 | 173,302 | 165,923 |
| Pocahontas | 12,252 | 10,597 | 21,877 | 22,551 |
| Southern | 15,837 | 14,712 | 294,451 | 240,397 |
| Northwestern | 34,573 | 28,857 | 159,127 | 141,383 |
| Central Western | 11,806 | 14,751 | 266,276 | 259,962 |
| Southwestern | 11,917 | 12,925 | 163,956 | 171,689 |
| Total | 253,762 | 270,708 | 1,314,850 | 1,249,103 |

COMPARATIVE TOTAL LOADINGS, 1928 AND 1929

| | 1928 | 1929 |
|---|---|---|
| ***Limestone flux*** | ***253,762*** | ***270,708*** |
| ***Sand, stone, gravel*** | ***1,314,850*** | ***1,249,103*** |

## Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning August 10:

### CENTRAL FREIGHT ASSOCIATION DOCKET

22298. To establish on **sand and gravel,** carloads, Coleman and Munger, Ill., to C. S. S. & S. B. stations, Miller to Michigan City, Ind., inclusive, rate of 88c per net ton. Present rates—Sixth class.

22300. To establish on **gravel and sand,** carloads, Howard, O., to destinations shown below, following rates. Present and proposed rates, in cents per ton of 2000 lb.

| To— | Proposed rate | Present rate |
|---|---|---|
| Brucyrus, O. | 90 | 120 |
| Marion, O. | 100 | 120 |
| Lima, O. | 120 | 140 |

22304. To establish on **sand, blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica,** carloads, from Cincinnati, O., to New Albany and Jeffersonville, Ind., and Louisville, Ky., following rates. Present and proposed rates, per ton of 2000 lb.

| To— | Proposed rate | Present rate |
|---|---|---|
| New Albany, Ind. | 164 | * |
| Jeffersonville, Ind. | 164 | * |
| Louisville, Ky. | 177 | 189 |

*Sixth class rates apply.

22309. To establish on **sand and gravel,** carloads, Zanesville and Fair Oaks, O., to Newark, O., rate of 65c per net ton. Present rate, 70c per net ton.

22310. To establish on **gravel,** carloads, from Phalanx, O., to Dundee, O., rate of 100c per net ton. Present rate, 140c per net ton.

22317. To establish on **limestone, ground or pulverized,** carloads, from E. St. Louis and Kellogg, Ill., and other points of origin as specified in Items 1240 and 1245 of C. F. A. L. Tariff 130S, to C. F. A. territory east of the Indiana-Illinois state line. Rates on basis of 60% of sixth class. Present rates, 65% and 80% of sixth class.

22322. To establish on **crushed stone,** in bulk, in open-top cars only, carloads, from Chicago, Ill., and points taking same rates to Berrien Springs, Mich., rate of 115c per net ton. Present rate, 330c per net ton, sixth class.

22325. To establish on **sand, blast, glass or molding,** carloads, from Michigan City, Ind., to Boston, Mass., rate of 31c. Present rate, 32c.

22326. To establish on **sand, viz.: Blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding and silica,** carloads, Glass Rock, O., to Centerburg and Mt. Vernon, O., rate of 80c per net ton. Present rate, 90c per net ton. Route, via N. Y. C. R. R. to Centerburg, O., P. R. R. to Mt. Vernon.

22353. To establish on **sand and gravel,** carloads, Dundee, Ind., to Greentown, Ind., rate of 80c per net ton. Present rate, 99c per net ton.

22360. To cancel from C. F. A. Tariff 347 and similar issues of individual lines, all commodity rates on **sand** (all kinds) and **gravel,** carloads, from points in C. F. A. territory to destinations in Canada. This revision is to affect only local rates, and no change to be made in the proportional rates published as such, or any local rates from Chicago, Peoria, etc., which are being applied on traffic originating in Wisconsin, etc.

22371. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel,** carloads, South Lorain, O., to Oberlin, O., rate of 60c per net ton. Present rate, sixth class.

22372. To establish on **sand, core,** carloads, from Kankakee, West Kankakee, Greenwich and Van's Siding, Ill., to various points in Indiana and Ohio, rates as shown in Exhibit "B" attached. Present rates, sixth class.

EXHIBIT "B"

| To | Prop. rate | Kickapoo scale |
|---|---|---|
| Alexandria, Ind. | $1.26 | $1.10 |
| Anderson, Ind. | 1.26 | 1.15 |
| Brazil, Ind. | 1.64 | 1.30 |
| Decatur, Ind. | 1.51 | 1.30 |
| Elkhart, Ind. | 1.26 | 1.10* |
| Ft. Wayne, Ind. | 1.26 | 1.25 |
| Frankfort, Ind. | 1.26 | 1.10 |
| Kendallville, Ind. | 1.26† | 1.20* |
| Kokomo, Ind. | 1.26 | 1.10 |
| Logansport, Ind | 1.26 | 1.10 |
| Marion, Ind. | 1.26 | 1.20 |
| Mishawaka, Ind. | 1.13 | 1.05* |
| Montpelier, Ind. | 1.26 | 1.35 |
| Muncie, Ind. | 1.26 | 1.25 |
| Wabash, Ind. | 1.26 | 1.15 |
| Warsaw, Ind. | 1.26 | 1.10 |
| Cincinnati, O. | 2.39 | 1.50 |
| Dayton, O. | 2.39 | 1.50 |
| Springfield, O. | 2.30 | 1.50 |
| Hamilton, O. | 2.39 | 1.45 |
| Middletown, O. | 2.39 | 1.50 |

Rates apply per net ton.
*Single line.
†Held to Ft. Wayne, Ind., rate account intermediate via N. Y. C.

22373. To establish on **sand, viz., blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica,** carloads, from Centerton and Campbells, Ind., to Jeffersonville, Ind., rate of 156c per net ton (applicable only on traffic destined to points in green line territory as defined in C. F. A. territorial directory No. 3-E, I. C. C. 2008. Present rate, 176c per net ton.

22375. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel,** carloads, from Hamilton, O., to destinations shown below, following rates in cents per net ton:

| To | Pres. | Prop. |
|---|---|---|
| Seven Mile, O. | 80 | 60 |
| Collinsville, O. | 90* | 60 |
| Somerville, O. | 90* | 60 |
| Camden, O. | 90* | 60 |
| Eaton, O. | 90 | 70 |
| New Hope, O. | 105† | 75 |
| Campbellstown, O. | 105† | 75 |
| Richmond, Ind. | 105 | 80 |

*Intermediate to Eaton, O., from Miamiville, O.
†Intermediate to Richmond, Ind., from Miamiville, O.

22376. To establish on **crushed stone and crushed stone screenings,** carloads, Findlay, O., to Norwalk and Wellington, O., following rates in cents per net ton:

| To | Prop. | Pres. |
|---|---|---|
| Norwalk, O., via N. Y. C.-W. & L. E. | 90 | *100 |
| Wellington, O., via W. & L. E. | 90 | †100 |

*Berea, O., rate under intermediate application.
†Wellington, O., rate under intermediate application via Toledo, O.

22377. To establish on **limestone, ground,** carloads, Danbury and Marblehead, O., to destinations shown below, following rates in cents per net ton:

| To | Prop.* | Pres. |
|---|---|---|
| Bay City, Mich. | 250 | 320 |
| Battle Creek, Mich. | 220 | 320 |
| Flint, Mich. | 220 | 265 |
| Grand Rapids, Mich. | 250 | 320 |
| Kalamazoo, Mich. | 230 | 320 |
| Lansing, Mich. | 220 | 310 |
| Saginaw, Mich. | 250 | 320 |

*60% of sixth class.

22403. To establish on **sand and gravel,** carloads, from Lafayette, Ind., to Lottaville, Ind., rate of 110c per net ton. Present rate, 138c per net ton. Route—Via C. I. & L. Ry., Haskells, Ind., and G. T. Ry.

22404. To establish on **crushed stone,** carloads, from McVittys, O., rate of 85c to Bowling Green, O., and rate of 100c per net ton to Perrysburg, O. Present rates, sixth class. Routes—To Bowling Green, O., via C. C. C. & St. L. Ry.-N. Y. C. R. R.; to Perrysburg, O., via C. C. C. & St. L. Ry.-B. & O. R. R.

22407. To establish on **crushed stone and crushed stone screenings,** carloads, Blanchard, O., to Tiffin, O., rate of 85c per net ton. Route—Via N. Y. C. R. R.-C. C. C. & St. L. Ry. Present rate, sixth class.

22410. To establish on **sand and gravel,** carloads, from Dresden, O., rates of 95c to Piedmont, O., and 105c per net ton to Barton, O. Present rates, 14½c to Piedmont and 20c to Barton, O., sixth class.

22412. To establish on **crushed stone, crushed stone screenings and agricultural limestone** (not ground or pulverized), in bulk, in open top cars, carloads, from Whitehouse, O., to Michigan destinations shown below:

| To | Prop. | To | Prop. |
|---|---|---|---|
| Vienna | 87 | Trenton | 102 |
| Monroe | 92 | Wyandotte | 102 |
| Newport | 97 | Ecorse | 102 |
| Rockwood | 97 | Detroit | 102 |

Present, sixth class. Route—Wabash Ry., Toledo, O., and D. & T. S. L. R. R.

### TRUNK LINE ASSOCIATION DOCKET

21374. **Sand and gravel,** other than blast, engine, foundry, glass, molding, sea or silica, carloads (See Note 2), from Susquehanna, Penn.

| To Erie railroad stations— | Prop. rate | Pres. rate |
|---|---|---|
| Long Eddy, N. Y. | $1.00 | $1.15 |
| Hankins, N. Y. | 1.05 | 1.25 |
| Callicoon, N. Y. | 1.05 | 1.25 |
| Cochecton, N. Y. | 1.10 | 1.35 |
| Skinner's Falls, N. Y. | 1.10 | 1.35 |
| Narrowsburg, N. Y. | 1.10 | 1.35 |
| Mast Hope, Penn. | 1.10 | 1.35 |
| Lackawaxen, Penn. | 1.15 | 1.35 |
| Shohola, Penn. | 1.25 | 1.35 |
| Parkers Glen, Penn. | 1.25 | 1.35 |
| Pond Eddy, Penn. | 1.25 | 1.35 |
| Elmira, N. Y. | 1.10 | 1.35 |

Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

21384. **Crushed stone,** carloads (See Note 2), from Steelton, Penn., to Harrisburg, Penn. *$20 per car, regardless of weight. (Present rate, 60c per net ton.) *This rate will not include any allowance to the Steelton and Highspire R. R. for switching and will apply in 10 car lots only. Rate to expire upon completion of Harrisburg work. Reason—To meet motor truck competition.

21388. **Crushed stone,** carloads (See Note 2), from Birdsboro to Clonmell, Penn., 90c per net ton present rate $1.05 per net ton). Reason—Proposed rate is comparable with rates to Honey Brook Gap, Penn., and Claymont, Del.

21390. **Crushed stone,** carloads (See Note 2), from Beavertown, Penn., to Selinsgrove Junction, Penn., 80c per net ton (present rate 90c per net ton). Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

21392. **Sand, carloads** (See Note 2), from Menantico, N. J., to Malaga, N. J., 58c, and Elmer, N. J., 72c per net ton. Rates to expire December 31, 1929. Reason—To meet motor truck competition.

21407. To establish rate of 9c per 100 lb. on **limestone,** unburnt, ground or pulverized, carloads, minimum weight 50,000 lb., from B. & O. R. R. points in the Grove, Frederick, Security, Martinsburg, Winchester and Strasburg, Va., district to all points on the C. & Penn. R. R., exclusive of Cumberland, Md., and Piedmont, W. Va. (Present rate, 11c per 100 lb.) Reason—Proposed rates are fairly comparable with rates from Martinsburg, W. Va., and Strasburg, Va., to Piedmont W. Va., Rockwood, Penn., Westernport, Md., and from York, Penn., to Westernport, Frostburg, Md., and Piedmont, W. Va.

21423. **Sand,** other than blast, engine, foundry, molding, glass, silica, quartz or silex, carloads, **also gravel,** carloads (See Note 2), from Wilmington, Del., to Queen Anne, Md., and Willoughby, Md., $1.15 per net ton. Reason—Proposed rate is comparable with rates from Bacon Hill, Northeast, Charlestown and Principic, Md., to same points.

21428. **Sand,** N. O. I. B. N., in O. C., carloads (See Note 2). Rates per net ton from Linden, Penn.:

| To (N. Y.) | Prop. | Pres. |
|---|---|---|
| Rochester | $1.70 | $1.85 |
| Lockport | 1.80 | 2.05 |
| E. Buffalo to Suspension Bridge | 1.80 | 2.05 |

Reason—Proposed rates compare favorably with rates now in effect on molding sand for like distances, services and conditions.

21431. **Sand, common or building** (not blast, engine, fire, foundry, glass, molding or silica) **and gravel,** carloads (See Note 2), from Winburne, Penn. Rates per net ton.

| To Pennsylvania stations on the C. & I. R. R. | Prop. | Pres. |
|---|---|---|
| Culver | 1.30 | $1.60 |
| Preisser | 1.30 | 1.60 |
| Nipton | 1.30 | 1.60 |
| White Mill | 1.30 | 1.60 |
| Stiles | 1.30 | 1.60 |
| Kniter | 1.30 | 1.60 |
| Sides | 1.30 | 1.60 |
| Greismore | 1.30 | 1.60 |
| Glory | 1.30 | 1.60 |
| Edwards | 1.30 | 1.60 |
| Belsano | 1.30 | 1.60 |
| Nant-y-glo | 1.40 | 1.60 |
| Revloo | 1.40 | 1.60 |

Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

21223. **Crushed stone,** carloads (See Note 2), from Northampton, Penn., and Bethlehem, Penn., to Penobscot, Penn., $1 per net ton. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

21225. **Sand,** carloads (See Note 2), from Birmingham, N. J., and South Pemberton, N. J., to Ewansville, N. J., 40c per net ton, rate to expire November 30, 1929 (present rate 69c per net ton). Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

21227. **Broken or rubble granite,** carloads (See Note 2), from Woodstock, Md., to Washington, D. C., $1.05 per net ton (present rate $1.51 per net ton). Reason—Proposed rates are comparable with rates on crushed stone between same points.

21246. **Stone, natural** (other than bituminous asphalt rock), **crushed,** carloads (See Note 2), from South Amsterdam, N. Y., to Mechanicsville, Ushers, Elnora and Scotia, N. Y., $1.10 per net ton. Reason—Proposed rates are comparable with rates now in force from Feura Bush, N. Y.

21251. **Gravel and sand,** N. O. I. B. N. in O. C., except blast, engine, foundry, glass, molding, quartz, silex and silica, carloads (See Note 2), from Shickshinny, Penn., to Sunbury, Penn., $1.10 per net ton. (Present rate, $1.20 per net ton.) Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

21252. **Crushed stone,** carloads (See Note 2), from Dalmatia, Penn., to Trevorton, Penn., $1.40 per net ton. (Present rate, $1.75 per net ton.) Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

21276. **Crushed stone,** carloads, minimum weight 90% of marked capacity of car, from Le Roy, N. Y., to Taintors, Penn., $1.30 per net ton.

21278. **Crushed stone,** carloads, minimum weight 90% of marked capacity of car, from Bethlehem, Penn., to Stockertown, Penn., 90c per net ton (present rate $1 per net ton). Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

21280. **Sand,** other than blast, engine, foundry, molding, glass, silica, quartz or silex, carloads, minimum weight 90% of marked capacity of car, from Morrisville and Tullytown, Penn., to Rocky Hill, N. J., 80c per net ton (present rate 90c per net ton). Reason—Proposed rates are comparable with rates from and to points in the same general territory.

21282. **Sand,** carloads, minimum weight 90% of marked capacity of car, from Toms River, N. J., to Rahway, N. J., $1.10 per net ton (present rate $1.30 per net ton). Reason—Proposed rate is comparable with rates on like commodities from and to points in the same general territory.

21294. **Sand and gravel,** carloads, minimum weight 90% of marked capacity of car, from Jersey City (National Docks), N. J., to Bayonne (East 22nd St. and East 49th St.), N. J., 50c per net ton. Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

### WESTERN TRUNK LINE DOCKET

6907-A. **Stone, crushed,** carloads, from Osage, Ia., to Ottawa, Ill. Present rate, $2.40; proposed, $1.75 per net ton.

4901C. **Stone, crushed (dolomite),** carloads (See Note 2), when loaded in gondola cars, and when loaded in hopper bottom cars minimum weight 75,000 lb., from Inland Jct., Mich., to Chicago, Ill. Present rate, 16c; proposed, 13½c per 100 lb.

6962. **Limestone, agricultural,** carloads, minimum weight marked capacity of car, from Dubuque, Ia., to various points in Wisconsin on the C. & N. W. Ry., of which the following are representative. Rates in cents per 2000 lb.:

| | Pres. | Prop. | | Pres. | Prop. |
|---|---|---|---|---|---|
| Cuba City | 123 | 90 | Montfort | 133 | 106 |
| Platteville | 123 | 90 | Lancaster | 143 | 115 |

2310H. **Sand,** carloads (See Note 2), except that when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity actual weight shall be the minimum, but not less than 40,000 lb., from Bay City, Wis., to Dubuque, Ia. Present rate, 9½c per 100 lb.; proposed, $1.50 per ton.

3106. **Stone, crushed,** carloads, minimum weight 40,000 lb., from Ablemans, Wis., to St. Joseph and Benton Harbor, Mich. Present rate, $2.65 per net ton (Chicago combination); proposed, $2.15 per net ton.

496N. **Stone, rip-rap,** usual minimum weight as provided on crushed stone in W. T. L. Tariff 175, from Weeping Water, Neb., to Niobrara, Neb. Present, 12c per 100 lb.; proposed, 10c per 100 lb.

6983. **Sand, silica,** carloads (See Note 3), but not less than 60,000 lb., from Browntown, Wis., to destinations in W. T. L. 41 series, and Jones' 218 series, to which rates are now published from Ottawa, Ill., Oregon, Ill., and Muscatine, Iowa, etc. Present and proposed rates per ton to a few representative points are as follows. Present:

| To— | Ottawa | Browntown |
|---|---|---|
| Buffalo | 3.53 | 6.50 |
| Cleveland | 3.15 | 3.99 |
| Detroit | 2.90 | 3.62 |
| Pittsburgh | 3.53 | 4.38 |
| Boston | 7.30 | 7.70 |
| New York | 6.53 | 7.30 |
| Philadelphia | 6.43 | 6.90 |

Proposed—Same rates from Browntown, Wis., as in effect from Ottawa, Ill. Rates are in dollars and cents per ton.

6991. **Sand, gravel, sand and gravel, pit strippings; stone, broken, crushed, ground, rubble or rip rap; limestone, agricultural, ground or pulverized; stone quarry strippings, chatts or cinders** (See Note 2), except when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity, the actual weight will apply, but in no case shall the minimum weight be less than 40,000 lb., between points in Iowa on west bank Mississippi river, Dubuque to Muscatine, inclusive, and stations in Wisconsin in W. T. L. territory. Present—Distance scale published in Item 1730A, C. M. St. P. & P. G. F. D. 4100J. Proposed scale—Item 1600, same tariff.

602B. **Sand,** carloads, usual minimum weight, from Turner, Kan., to Columbia, Mo. Present rate, $2.44 per net ton; proposed, $1.50 per net ton.

### SOUTHERN FREIGHT ASSOCIATION DOCKET

46442. **Limestone,** Erin, Tenn., to Memphis, Tenn. Present rate, 280c per net ton. Proposed intrastate rate on limestone, ground, powdered or pulverized, straight or mixed carloads, minimum weight 60,000 lb., from Erin, Tenn., to Memphis, Tenn., 153c per net ton. Made with relation to rates that have been established on this commodity between other southern points.

46469. **Limestone,** from Mt. Vernon, Ky., to L. & N. R. R. Knoxville division stations. It is proposed to establish through rate of 108c per net ton on limestone, ground (agricultural stone), carloads, minimum weight 60,000 lb., from Mt. Vernon, Ky., to Highcliff, Tenn., made with relation to rates between other southern points. It is also proposed to reduce the present rates to intermediate Knoxville division stations, Emlyn through Lot, Ky., to be not higher than proposed to Highcliff, Tenn.

46564. **Gravel,** from Johnsonville, Tenn., to Finger, Tenn. Camden combination applies at present. Proposed to establish rate of 125c per net ton on gravel, carloads (See Note 3), from Johnsonville, Tenn., to Finger, Tenn., made same as recently suggested to Selmer, Tenn.

46580. **Agricultural limestone,** from Hopkinsville and Nicholson, Ky., to Cincinnati, O. Combination rates apply at present. Proposed to establish rate of 189c per net ton on agricultural limestone (ground or pulverized), in bags, barrels, in bulk (See Note 3), carloads, from and to points named above, made with relation to rates in effect from and to other points in southern territory.

46611. Switching charge on **gravel** at Montgomery, Ala. It is proposed to establish a charge of $6.30 per car in lieu of present charge of $2.25 per car assessed for switching gravel, carloads, from Pruitts, Ala., to Montgomery, Ala., on traffic destined to points beyond the switching limits of Montgomery, this charge to be made only where switching charges of the M. & O. R. R. are absorbed by its connections.

### ILLINOIS FREIGHT ASSOCIATION DOCKET

5128. **Crushed stone, sand and gravel,** carloads, from Joliet, Millsdale and Lemont, Ill., to Suffern, Turpin, Mt. Zion, Hervey City, Prairie Hill, Lake City, Ullrich, Livingston and Williamsburg, Ill. Present, no commodity rate in effect; proposed, $1.01 per ton.

5139. **Crushed stone, sand and gravel,** carloads, in open top cars (See Note 1), except when loaded to full visible capacity, actual weight to apply, from Joliet, Ill., to Decatur, Ill. Present, $1.01 per ton; proposed, 88c per ton.

5141. **Rip rap stone,** carloads (See Note 3). Rates in cents per net ton.

| From | Pres. | Prop. |
|---|---|---|
| Joliet, Ill., to Chicago Heights, Ill. | 150 | 50 |

5146. **Sand and gravel,** carloads (See Note 1), from Forreston, Ill., to Illinois points on I. C. R. R. Rates (to representative points) in cents per net ton.

| To | Pres. | Prop. | To | Pres. | Prop. |
|---|---|---|---|---|---|
| Kenney | 113 | 101 | Havana | 176 | 126 |
| Toronto | 164 | 126 | Mason City | 151 | 114 |
| Farmersville | 176 | 126 | Pekin | 164 | 101 |
| | | | Heman | 114 | 101 |

### SOUTHWESTERN FREIGHT BUREAU DOCKET

18119. **Sand,** from Sico, Okla., to Ft. Smith, Ark. To establish a rate of 9c per 100 lb. on sand, carloads (See Note 3), from Sico, Okla., to Ft. Smith, Ark. A concern has located at Sico (three-quarter mile from Randolph, Okla.), and in view of the fact that the federal commission has fixed 9c (the same as the 9702 scale) as proper from Roff, we feel that the rate herein proposed from Sico is reasonable and proper, especially since the distance from Sico to Ft. Smith is less than that from Roff by 32 miles.

### NEW ENGLAND FREIGHT ASSOCIATION DOCKET

17559. **Sand, core** (See Note 2), from Davisville, East Providence Wharf and Fox Point, R. I., to South Plainfield, N. J. Present rates, 28½c; proposed, 18½c. Reason—To provide commodity rate on same basis as rate now in effect from and to other points.

17419. **Sand, blasting, core, fire and sea** (See Note 2), from Randolph, Mass.

| To— | Present | Proposed |
|---|---|---|
| Readville, Mass. | 10 | 5½ |
| Framingham, Mass. | 13 | 7 |
| Hyde Park, Mass. | 10½ | 6 |
| Boston, Mass. | 10 | 5½ |

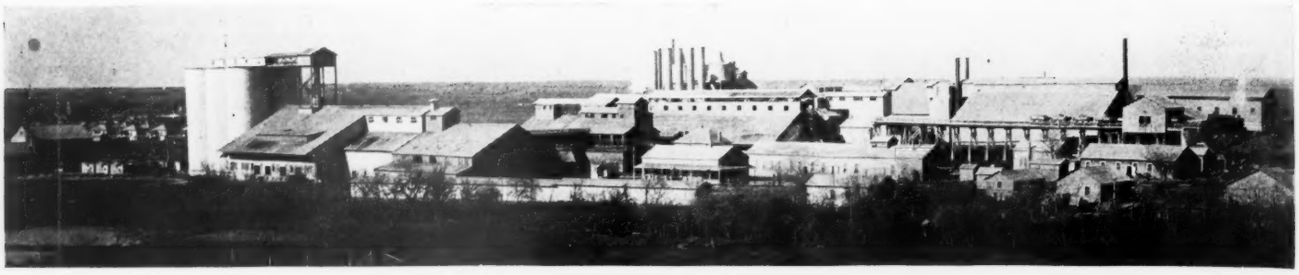
And 55% of 6th class to any other local station on the N. Y. N. H. & H. R. R., to which there may be a movement of this sand in the future from Randolph, Mass.

Reason—To establish from Randolph, Mass., same basis of rates on sand as apply from other producing points.

17425. **Stone, broken or crushed** (See Note 2), from Plainville (Cook's Quarry), Conn., Branford (Pine Orchard Quarry), Conn., Westfield (Hampden Quarry) to various N. Y. N. H. & H. stations. (Copy of exhibit showing proposed and present rates will be furnished upon request.) Reason—To align rates and to meet competition experienced at some of the points of origin.

## South Carolina Gravel Rates

THE Interstate Commerce Commission has instituted an investigation in No. 22109, rates on sand, gravel, crushed stone and chert within the state of South Carolina, to determine the lawfulness of rates required by the railroad commission of South Carolina.



*The Dallas, Tex., plant of the Trinity Portland Cement Co.*

# Dallas Trophy Dedicated Independance Day

## Trinity Mill at Eagle Ford Celebrates Big Event

DALLAS, Texas, and surrounding region were treated to an altogether new method of celebrating July 4 when the Portland Cement Association safety trophy was dedicated at the plant of the Trinity Portland Cement Co. at Eagle Ford, a suburb of Dallas, on Independence Day afternoon.

Officials and employes of the mill and their families and friends and local citizens turned out in large numbers while the industrial community was quick to accord record recognition to the first of Dallas' big industries to operate a calendar year without lost-time accident. In fact the last accident falling in this category occurred in this plant November 26, 1927, 20 months ago. Some of the mill departments have safe records dating back several years.

The dedication ceremonies took place in a large tent erected next to the mill office and extending to the site of the handsome cast stone monument. Music was furnished by Walter Free's band of Dallas. J. W. Ganser, assistant superintendent and chief chemist, acted as chairman; Charles E. Ulrickson, vice-president and general manager, represented the company management; Charles F. Simpson, district engineer of the Portland Cement Association, represented the presentors, and O. V. Bartholomew, general superintendent, accepted the trophy on behalf of the mill organization.

*C. F. Ulrickson*

In opening Mr. Ganser said, in part:

### *Over 19 Months of "Safety"*

"We are gathered today, for the second time on the Fourth of July, for a 'Safety' celebration. Last year we celebrated the 4th because we went through the month of June without a lost-time accident. At that time we thought we were making great strides in safety work because we had gone about seven months without a serious accident. Today we are celebrating the event of this plant going through the entire year of 1928 without a lost-time accident. We have up until today, I think, gone 19 months and one week without a lost-time accident.

". . . We all know that 'Safety' must start at the top. We have heard that many a time, and I believe that our organization has instilled 'Safety' into us from the top. Our first speaker will be C. E. Ulrickson, vice-president and general manager of the Trinity Portland Cement Co."

Mr. Ulrickson said:

"I am naturally very proud of this occasion and of the part that has been assigned to me. But more than that, I am proud of this occasion because of the thing that has brought it about. As your chairman has tersely stated, this 'safety' work is becoming

*W. A. McCourtie*

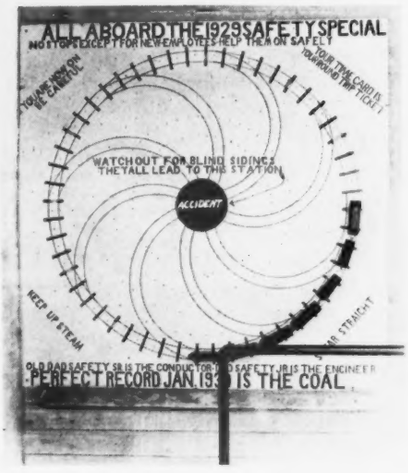
*O. V. Bartholomew*

a factor of more and more importance, not only in our organization, but in manufacturing organizations generally; and to be successful it must necessarily begin at the top. In this 'safety' work I have tried to take as active a part as it has been possible for me to take.

"The Portland Cement Association became active in 'safety' work beginning, I think, about the year 1916; and either in that year or the following year it became my pleasure as well as my duty to become a member of the committee on accident prevention and insurance. On that committee I served, I think, six years. At that time 'safety' work was more or less coming to the front, not only with the executives of the cement industry, but among the employes as well. We are now making great process in this safety work in the industry. Of the cement plants of this country—about 135, I think—you will be glad to know that 17 of them went through the year 1928 without a lost-time accident; and this company was one of those plants. I want to say that this was more cement plants than had, in all the years previous, been awarded this trophy. You will readily understand what this means and what remarkable progress has been made.

*J. W. Ganser*

*Left to right—Back row: R. C. Youngblood, L. M. Fisher, J. W. Ganser (chairman), A. C. Carr, S. A. Davidson, D. D. Day, E. S. Pickens and W. O. Stuart. Front row: G. M. Orr, W. T. Ross, J. D. Cummers, George McDowell, H. F. Lamb, J. R. Poindexter and C. A. W. Sutherland*


ALL ABOARD THE 1929 SAFETY SPECIAL
WATCH OUT FOR BLIND SIDINGS THE TALL LEAD TO THIS STATION
ACCIDENT
KEEP UP STEAM
PERFECT RECORD JAN. 1929 IS THE COAL

*Safety board at the plant*

"The heads of this organization can accomplish nothing along safety lines without the cooperation of the employes themselves; and I am proud to be able to say—to pay tribute to them now, that without their good efforts this celebration that we are having today could not have taken place.

"I take pleasure in welcoming you all here today. We are proud to have with us a number of executives and employes from competitive plants, and we hope another year we may have the pleasure of joining them in celebrating an event similar to this. To all of them I wish to extend a most hearty welcome, and hope that we will have the privilege of inviting them back in successive years for similar events."

Mr. Simpson was then introduced and made the formal presentation of the trophy.

Mr. Bartholomew, accepting the trophy on behalf of the mill organization, spoke in part as follows:

"I accept this handsome trophy for the Trinity Portland Cement Co. and its employes. I hope we can go through another year without a lost-time accident, and have

*Part of the crowd at the barbecue*

*A watermelon-eating contest was one of the features*

*A group of white employes who participated in the celebration*

an additional inscription placed on this monument to safety and achievement. I know that you men have tried hard. It is no easy task to do what you have done. If it had been there would be a lot more companies awarded a similar honor."

The chairman then called upon Vice-President Ulrickson, who said:

"I have been asked to read a letter and a telegram or two, and in connection therewith I want to make one or two statements. This safety work is carried on by the Portland Cement Association, as I have already indicated, being largely in the hands of a committee appointed for that purpose. The chairman of that committee is an outstanding executive of the cement industry, and to the duties of this safety work he devotes worlds of time. He happens to be a good friend of mine, and upon learning of this celebration he sent the following telegram from Newayo, Mich.:

SINCERE CONGRATULATIONS ON THIS RED LETTER DAY IN THE HISTORY OF YOUR PLANT AND CITY. THE ENTIRE CEMENT INDUSTRY IS PROUD OF YOUR ACHIEVEMENT, AND I EXTEND BEST WISHES ON THIS HAPPY OCCASION. MAY YOU HAVE MANY MORE OF THEM.
(SIGNED) J. B. JOHN.

"The hard work of the committee just referred to is largely performed by the secretary of the committee, A. J. R. Curtis, assistant to the general manager of the Portland Cement Association. He has expressed his inability to attend in a letter to the safety committee of our Dallas plant.

"I also received a telegram this morning from our president, Mr. McCourtie, who is now at Cleveland, Ohio, requesting me to extend to you his best wishes and his regrets that he cannot be with us on this occasion.

"Another thing we are proud of at this plant is the fact that we still have in our employ a number of men who began with us in 1908 when the plant was first started. We also have in our organization some factors that might be termed employes, which many of you people do not know much about. For instance, we have a firm of attorneys that we contracted with in 1907, and like some of the others they have stayed with us and done their part well, just as you have done yours. It is our pleasure to have with us today one of these attorneys, and I take pleasure in introducing Will Harris of the firm of Thompson, Knight, Baker and Harris."

Mr. Harris spoke in part as follows:

"I think of the fact that Congress appropriates hundreds of millions of dollars a year for no other purpose than for the safety of the United States. Hundreds of millions are spent every year to maintain our army and navy and provide for our safety as a nation. But what does it profit us if our country is safe if the people themselves are not safe? For our government is for no other purpose than to provide for the welfare of our men, women and children.

"Mr. Ulrickson told you that we have been your attorneys since 1907. We were your attorneys before Mr. Ulrickson became your vice-president. I think he came from Jackson, Mich., a little town up there that I had never heard of before. He was so simple in his manner and so unassuming in his talk that he was in about four or five conferences with me before I discovered that he was smart.

"Accidents tax an industry; they tax individuals. . . . This monument that you have won could not have been won without the

*Colored and Mexican employes of the Trinity company attended the big event*

cooperation of your officers and men. It has been said that 'Eternal Vigilance is the Price of Safety.'

"I have been a practicing lawyer for 20 years, and in law we have 'Negligence—Gross Negligence and Criminal Negligence.' The question is often asked in court, 'Is this an unavoidable accident?' and the jury often says 'Yes.' My experience has led me to believe that there is no such thing as an unavoidable accident. When you have an accident, 'eternal vigilance' would have prevented it. My observation has been that somebody's thoughtlessness is at the bottom of every accident that happens."

Chairman Ganser then closed with the following remarks:

"We have not had a man killed at this plant for five years. The five years previous to that we had an average of one man killed a year. But I am happy to say now that we hardly know what an ambulance looks like any more, and I hope we may not see another."

The barbecue held in the field below the mill was enjoyed by all, after which pictures were taken of different groups, and a baseball game between the Trinity Portland team and a team from Dallas closed the program for the day.

# Exshaw Mill Dedicates Its Trophy

## Canada Plant in the Rockies Celebrates Freedom from Mishaps

ON July 15, Plant No. 12 of the Canada Cement Co., Ltd., at Exshaw, Alberta, celebrated the dedication and unveiling of the trophy awarded by the Portland Cement Association for a perfect safety record during 1928.

The Exshaw mill, most westerly of the plants of the Canada company, has been a contender for trophy honors for several years. Three years ago, in 1926, there were seven lost-time accidents at the mill, many fewer than for the average cement plant. Reductions since then have been steady and this mill not only won the coveted association award in 1928, but it has avoided accidents thus far in 1929 as well.

*J. D. Johnson*

In behalf of A. J. R. Curtis, assistant to general manager of the Portland Cement Association, Chicago, who was prevented at the last moment from being present, J. D. Johnson of Montreal, vice-president of the Canada Cement Co., presented the trophy, which was accepted by H. G. Brown, secretary of the Exshaw plant's safety committee. W. D. Armstrong, plant superintendent, acted as chairman at the presentation ceremony and also at the banquet which followed.

To enable all the members of the mill organization to attend the presentation and banquet the cement plant was closed down from 5 o'clock in the afternoon to 11 o'clock. All of the employes, with their families, assembled for the exercises around the flag-draped trophy, which stands at the entrance to the mill town. The trophy design is familiar to Rock Products readers.

Superintendent Armstrong, in opening the ceremony, referred to the fact that the Canada Cement Co.'s plants at Port Colborne, Winnipeg, Hull and Belleville had in previous years received this safety tribute.

Before officially presenting the trophy, Mr. Johnson gave figures showing what great strides had been made from 1920 to 1928 in cutting down the accident toll. The number of days during which the various departments of the plant operated without accident were quoted by Mr. Johnson. These figures were published in Rock Products, May 25, 1929.

Mr. Johnson then formally dedicated the trophy and R. Kennedy, one of the plant employes, unveiled it.

The achievement of the plant, Mr. Armstrong stated, had been due to the cooperation of every employe, but special credit should be given to H. G. Brown, plant chemist and secretary of the safety committee, whom he called on to accept the trophy.

In a brief address Mr. Brown outlined the work accomplished by his committee since its foundation a few years previously and the great improvement in conditions which had been brought about. He complimented the employes on their record and expressed confidence that it would be repeated in the future.

The record of the Exshaw plant from the accident prevention point of view was referred to in some detail at the banquet which followed the ceremony. Mr. Armstrong pointed out that the mill had completed 603 days of operation without an accident and declared that the plant's present objective was 5½ more months of similar operations which would complete two consecutive years.

### *Dividend Producer*

W. F. McNeill, a member of the workmen's compensation board, expressed the congratulations of the board on the plant's record. This record, he said, would prove a good dividend producer to the company, to the employes and to the general public. He closed with the Irishman's remark: "It is better to be careful for five minutes than dead for all the rest of your life."

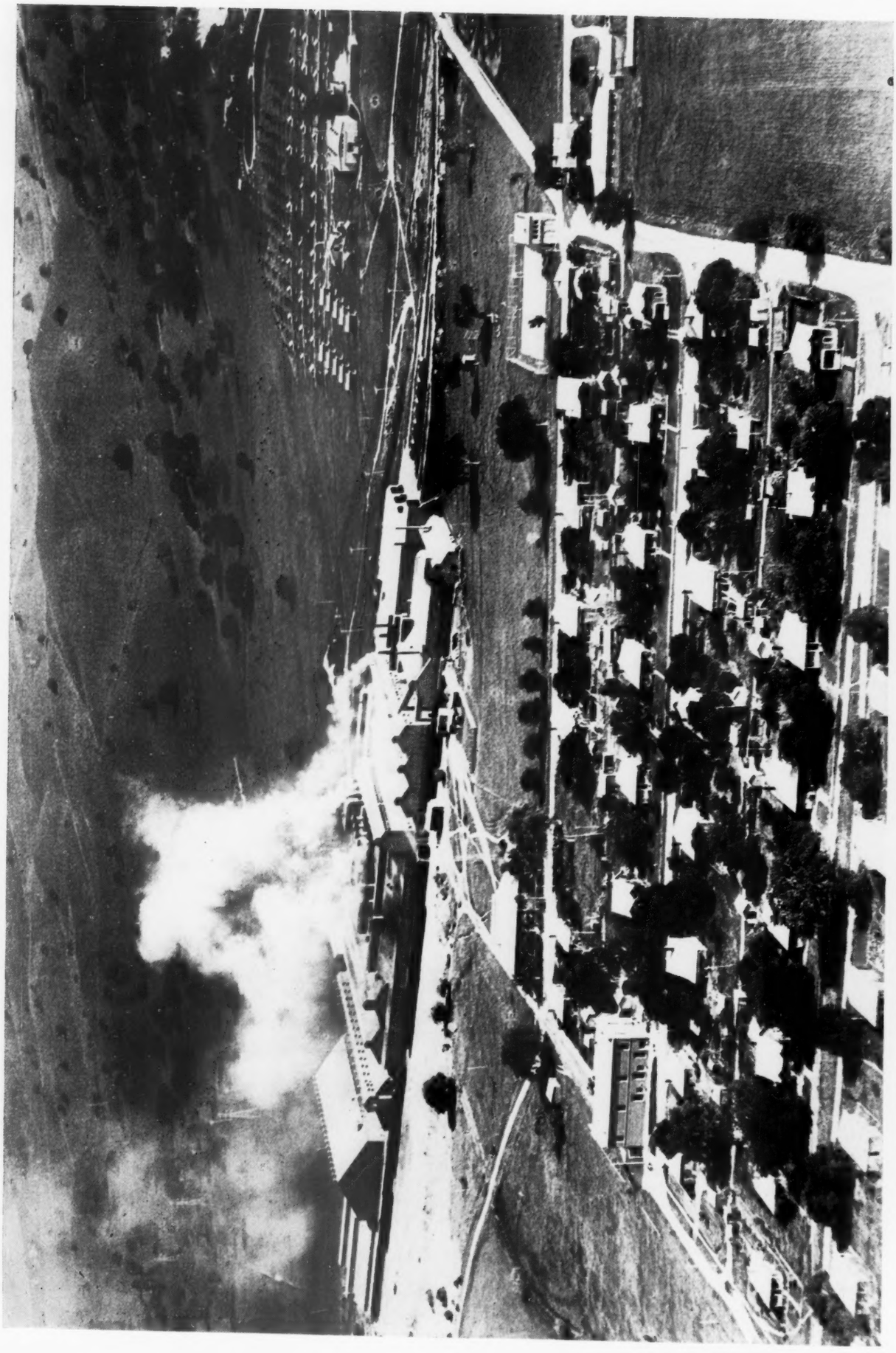
The relations between the factory inspectors to the various industries were touched on by the next speaker, H. M. Bishop, chief factory inspector for Alberta. He spoke of the number of safety recommendations made by the inspectors and expressed appreciation with regard to the cooperation extended by the executives and employes.

Dr. W. G. Carpenter, principal of the Institute of Techonology and Art, referred briefly to the part played by the institution with which he was connected in fitting the youth of the province to take his or her place in the complex social order of the day.

A. H. McGuire, Galgary, manager for the Canada Cement Co., was the final speaker of the evening.

A dance concluded the evening's program.

*The Exshaw, Alberta, plant of the Canada Cement Co., Ltd.*



*Aeroplane view of the Cowell Portland Cement Co.'s plant and surrounding community of Cowell, with its concrete houses*

# Cowell Rededication Another Unique Celebration

## July 4 Party at California Mill Which Had Last Accident in 1926

ON THE evening of July 4, employes of the Cowell Portland Cement Co. at Cowell, Calif., with their families and neighbors assembled at the mill for what has become the "annual mill party and trophy dedication." On the previous 4th of July a similar occasion was held in connection with the first trophy dedication at Cowell and now, with a record of no lost-time accidents since May, 1926, mill employes and management look forward to winning the trophy again in 1929 and consequently to another great party on July 4, 1930.

W. H. George, secretary and general manager of the Cowell Portland Cement Co., presided. In re-awarding the associa-

*E. D. Barnett, superintendent, Cowell mill*

tion trophy, A. P. Denton, district engineer, Portland Cement Association, said in part:

"We are here today to celebrate an achievement unique in the annals of the portland cement industry. It has been equaled seldom, if ever, with any other industry of comparable hazards. Your mill here at Cowell is one of the first three in America to work two consecutive calendar years without a lost-time accident. It is the only mill in America which has worked more than three years since May 11, 1926, without lost-time injury to a worker. . . .

". . . You have provided a most valuable example for other mills which we know they fully appreciate and are profiting by.

"You have brought to this thrifty community a distinction of which it may well be proud. You are acknowledged the most progressive and intelligent cement mill operators in America. . . .

". . . We sincerely hope that this concrete monument bearing its new inscription will continue to serve as a constant inspiration and reminder to you all throughout the years."

In accepting the trophy, Superintendent Barnett recognized the fine work of the men of his organization and thanked the Portland Cement Association for providing helpful suggestions and inspiration. The award of the Joseph A. Holmes certificate of honor again for 1928 was another noteworthy distinction. J. M. Harrington of the U. S. Bureau of Mines paid tribute to the Cowell record, particularly to the achievement of the quarry department, which has no lost-time accidents since August 14, 1925.

The response by Mr. George acknowledged the very effective work of the U. S. Bureau of Mines and the help received from that source by the Cowell company.

A dancing party concluded the evening's program.

*W. H. George*

## Activities of the Holmes Safety Association in Florida

THE NATIONAL COUNCIL of the Holmes Safety Association consists of representatives of state councils and local chapters, presided over by the director of the Bureau of Mines. The association does not replace but works in close co-operation with existing safety organizations.

Circular No. 6117 of the Department of Commerce, Bureau of Mines, recounts the activities of the association in the pebble phosphate fields of Florida, and includes reports of the Committee on Safety Week, October 22 to 27, 1928. Tabulated statistics on the number of accidents, accident cost and frequency, etc., are given.

## Strength of Slag Concrete

SYMPOSIUM No. 18 with the above title has recently been issued by the National Slag Association, Cleveland, Ohio. The data furnished in the bulletin tends to show that properly made slag concrete with sand as a fine aggregate has a compressive strength quite comparable to other concretes.

*Safety committee of the Cowell Portland Cement Co., which includes W. H. George, Superintendent Barnett and all of the foremen. This committee has planned the successful safety campaigns of the last three years*

# Safe Handling of Car Cables

THE FOLLOWING discussion as to safe methods for handling cable rigs for moving cars in cement mill shipping departments and under similar conditions was recently received by the Portland Cement Association. It has been reproduced with the permission of the association as of general interest to cement mill operators and safety committees.

**P. F. Balfour,** assistant superintendent and chief chemist of the Missouri Portland Cement Co. at its Independence, Mo., plant, writes in part as follows:

"We have two places where we use cables operated by electric motors to move cars. One is in front of the cement shipping department and the other is in front of the commercial rock shipping dock. In both places the motors are so located that the operator cannot see the car to which cable is attached. How is it advisable to proceed so as to insure absolutely safe operation of these cableways?"

### *Comments*

Several of the leading operating officials of various cement companies to whom this problem was referred have responded as follows:

**John Ahnfelt,** operating manager of the Universal Portland Cement Co. says:

"My suggestion in this case is to use two men when moving cars, one man to stay at the cars handling that end of the cable and the other man at the motor. If the motor cannot be moved so that the man handling it can see the other man, the control of the motor should be so placed that the man handling the latter can see, by looking in the same general direction, both the motor and the man pulling the car. This remote control of the motor should serve the safe purpose as if the motor was placed in open view from the cars which are to be moved."

**W. L. White, Jr.,** general superintendent of the Medusa Portland Cement Co., writes:

"We have 'carpullers,' that is, electrically operated drums, on which wind and unwind steel cables for moving railroad equipment on our tracks at various points. In all cases we so locate the hoist that the operator can see the equipment which he is moving. This can generally be done directly or indirectly through the use of sheaves."

**J. F. Magee,** management engineer, Alpha Portland Cement Co., says:

"We have always been careful to place our car-pulls so that the operator can see the movement of the cars and I would not consider it good practice to do otherwise. Of course the operator cannot see on both sides of the cars and if for any reason it is necessary or advisable to observe the situation on the opposite side from him we have a man ride the car or cars which are being moved to properly signal him."

**W. R. Dunn,** works manager of the Vulcanite Portland Cement Co., writes:

"We use an electric car pulling device which consists of a train of spur gearing driven by a small electric motor. The gear reduction is quite large and the wire rope which is ¾ in. in dia. operates at a speed which does not exceed 10 f.p.m.

"The purpose of our car puller is mainly to start the cars down a slight grade when they are spotted in place and stopped by means of the ordinary brake. The person operating the electric car puller in looking out of the door of the car puller house can see everything that is taking place. Our first care in the operation of this device is to keep the wire rope in good condition, free from loose ends, and the hook at the end of the rope carefully secured in place with no protruding loose wires to cut the operator's hands. We use new rope on this puller and keep same in first class condition at all times. So far we have had no accidents or no near accidents with this piece of machinery."

### *Likely Accident Causes*

In discussing Mr. Balfour's inquiry, R. H. Ferguson, safety engineer of the National Safety Council, assumes that the most likely causes of accidents under conditions such as Mr. Balfour described may be from men stepping on the cable or being struck by the car. Mr. Ferguson says:

"Where passageways exist over trackways it is not always the simplest matter to rearrange the exits to eliminate this hazard. In some cases, however, stairways or walkways have been built of sufficient height over these trackways to allow the cars and cable to pass underneath.

"Where such stairways are not advisable, it has been found practical in some instances to erect barricades or traffic deflectors to keep workers from walking from an exit straight onto the track. By erecting a fence, such as shown in the accompanying illustration and posting good warning signs, attention is called to the hazard on leaving the building. The same arrangement may be developed on the opposite side of the track.

"When night work is carried on it is advisable to install a good light, without glare, that any one approaching the location may know whether the car and cable are near. The barricade practically forces the worker to look both ways before crossing the track."

In discussing a method commonly employed around many cement plants, **F. Guenther, Jr.,** general superintendent of the Pennsylvania-Dixie Cement Corp., Kinsport, Tenn., plant, says:

"We use car hauls at three stations for two uses. We have a motor driven car haul on the coal trestle for moving cars to the dumping pit. This is placed close to the track and the cable works around a capstan. The cars move only a few feet and the operator is in full view and control of the machine.

"We also use two car hauls, one placed adjacent to either of the loading tracks at the pack house. These are a type of motor driven car haul made by Stephens-Adamson Co. and the capstan is on top of the machine. These are securely fastened in heavy concrete foundations and the customary clearance from center of track is complied with. The rope is made of manila, 2 in. in dia. The hook that is used is very heavy and large and there is no danger of it snapping from the point where it is attached to the car. The line of pull is almost parallel with the track and the man who operates it is always in full view of the cars and of course his machine, where he simply winds the rope around the capstan one turn and holds the slack end of the rope. The track has a drop of about 2% and these machines are used to drift empties down to the loading belts. We consider them very safe and have never had any near accident."

## Slate Production Costs

AS A NEW phase of the study of the general problem of production and manufacturing costs in the slate industry, being conducted by the United States Bureau of Mines, Department of Commerce, the development of simple, uniform, cost-accounting forms has been undertaken. The lack of a uniform system of keeping costs records in the slate industry was brought out as the result of a study of schedules containing production-costs figures furnished the bureau by operators some time ago.

At a conference recently held in Easton, Pa., with a group of Pennsylvania slate operators and certified accountants, cost-accounting forms prepared by the building materials section of the Bureau of Mines were discussed. The forms, after being changed in some respects, were presented for further discussion at a meeting of slate operators in Vermont on June 29. This conference voted a resolution approving the work of the Bureau of Mines in its effort to establish a better cost-accounting system, and requested that the forms, with explanatory text, be published by the bureau and thus made available to all operators.

## Welding Society to Meet in Fall

AN INTERESTING program, highly significant as a cross section of welding progress, has been arranged for the coming fall meeting of the American Welding Society to be held in Cleveland, Ohio, September 9 to 13, inclusive. Besides the technical sessions there will be a large exhibit of modern welding equipment and supplies.

# Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

## Northwest Concrete Products Association Meets at Shelton, Wash.

THE fourth annual mid-summer meeting of the Northwest Concrete Products Association was held July 26 and 27 at Shelton, Wash., and brought together again representatives from a large number of plants of Oregon and Washington, and a few of the visiting manufacturers from California. Meetings were held in the American Legion hall.

### *Large Delegation Present*

The association delegates were welcomed by Mayor A. A. Bower, who expressed great pleasure in having the association meeting in Shelton, lauded the efforts of G. W. Stoy, manager of the Shelton Concrete Products Co. in bringing about the convention. The response was made by E. B. Ballinger, second vice-president of the association from Seattle.

In delivering the report of the standards investigating committee, William Paddock of the Concrete Pipe Co., Seattle, advised that during the year the state of Washington will use bell culvert pipe on all sizes 30 in. and under. Some further requests had been made on the state highway department to alter concessions, but they declared that no further concessions would be made.

W. H. Sharp, chairman of the advertising committee, reported that the association had done such constructive advertising during the past few years that splendid results had been accomplished. The various advertisements, he advised, had been carefully worded, pictures used to advantage and in his opinion manufacturers had already "cashed in" on them, and numerous comments had been heard from the opposition.

In opening the afternoon session, President MacKenzie read an invitation from the California association urging all the members that possibly could to attend meetings of the California association to be held at the Alexandria hotel, Los Angeles, August 30 and 31.

In reading his annual address, President MacKenzie cited the tremendous growth of the cement industry during the past year and advised that the concrete products manufacturers had also been able to keep pace with them. He thanked the members and officers for their splendid cooperation, particularly Fred T. Evans, who had recently taken over the secretarial duties of F. R. Zaugg, and carried them on most successfully. He also called attention to the fact that former president of the association W. H. Sharp had been appointed a director of the American Concrete Pipe Association and was carrying on the work in his usual forceful manner.

*W. F. Mackenzie*

### *Correcting Adverse Conditions Within the Industry*

Further, he asked for action on correcting some adverse conditions both within and without the association, and asked that the certificate of quality really mean something. He urged the members to closely watch finished products not only of their own plant but also all others, and where they found poor products to bring them to the attention of the manufacturer, making an honest protest and have persisting offenders brought to time. Poor concrete products, Mr. MacKenzie believed, were the best ammunition of the clay interests.

In the matter of future advertising, it was suggested that this be curtailed, as the matter had been laid before the executive committee, who advised that the $1200 that was to have been received from the Pacific Coast Cement Association had been withdrawn.

The address of Maj. S. E. Hutton of the new Pacific Coast Cement Co. received close attention as he outlined the care with which their product was watched and assembled. He carried his hearers all through the various channels of cement manufacture, and in conclusion invited the members to visit their new modern plant in Seattle. He also urged his hearers to practice close control and study the elements of their problems and to individually absorb all information deccimated by the Pacific Coast Cement Association and adopt this information to their business. He just touched on diatomaceous earth which is received in small quantities from California and is used by a few companies to a limited extent, as also is oil impregnated clay.

### *Increasing Use of Concrete Products in Northwest*

Sumner E. Paine, city engineer of Everett, Wash., told the convention that his city was one of the first in the northwest to use concrete pipe and that there had never been any record of any failures. Everett has, he said, 52 miles of concrete sewers ranging in size from 6- to 36-in., and that all pipe 24 in. and over were of the reinforced type. Tests had been made by the engineering department and found satisfactory. Following his comments on manhole blocks, a discussion was held on a comparison of 4-in. versus 6-in. blocks, it being deemed wise to use the 6-in. blocks wherever practicable.

Harry Abel of the National Steel Fabric Co., Seattle, gave a most able address on "Salesmanship," in which he urged his hearers to have their sales end of the business better organized. He found that in his business this had been accomplished to a great extent by lengthening each day 30 minutes, making up the day's program for selling

between 7:30 and 8 a. m. He urged his hearers to devote more time to clear thinking, stating that intelligence plus work would when applied to concrete products result in a greater volume of sales, and that the manufacturers would in consequence get a greater enjoyment out of their work.

E. F. Goodner of the Northwest Testing Laboratories, in his talk on "Sidelights on Testing," told of the work necessary in testing various materials before certificates of quality could be issued, and of the great amount and variety of materials which had been worked on both for the government and private concerns. He urged his hearers to adhere strictly to specifications and many of their troubles would be eliminated. He cautioned the manufacturers on over-sanding in filling up voids, particularly in concrete pipe. Some manufacturers also have been using too fine a sand in their mixes, he said. In some plants workers had been in the habit of throwing back spillage into the molds, which caused variation in product.

In ending his address he said that the Northwest Testing Laboratory had been requested on numerous occasions to report on how many days of steaming would be the equivalent to 28 days of curing, but that they did not have such data on hand and were at a loss where to procure same.

J. L. Stannard, chief engineer, Lake Cushman Hydroelectric of Tacoma, gave an interesting outline of that city's various power plants, giving interesting figures of the amounts and quality of concrete which had entered into their construction.

The final activity on the first day's session was a wonderful chicken dinner at Schroder's Cove, which was addressed by a number of state officials from the highway department, including Samuel Humes, state highway engineer, and Bailey Tremper. Later in the evening dancing was enjoyed and the day called complete with a monster clambake on the beach at the extreme end of Puget Sound.

### *Research in Concrete Mixes*

The morning session of the second day was opened by another interesting paper and charts by Professor Graf of the Oregon State College, Eugene, who reviewed the Oregon Fellowship and the work that had been accomplished, citing that several of the students engaged in laboratory work since their graduation had found employment with some of the manufacturers belonging to the association. He stated that some 250 specimens of mixes used had been carefully tested in his department, and he advised his hearers that it had been found safe to use as much water as possible in dry mixes consistent with good products.

George Gleeson, also of the Oregon State College, gave another paper of some length, illustrated with charts, on "Surface Area of Proportions," stating that he had used the findings of Prof. L. N. Edwards to support his operations and recommended that same be followed if any plant had the time to make such experiments and also the necessary facilities. He also touched on the variations between the Edwards scale and that of R. B. Young, but recommended the former method, which would cover all practical mixes. In his tests Mr. Gleeson advised that he had used sand from Willamette river, Marshfield and Eugene. Included in his charts he showed the percentages of bulking and average sieve analysis trials.

Charles Delling of Puyallup Shope Brick Co., Puyallup, Wash., brought a quantity of concrete drain tile secured from various jobs after a long period of service and these were closely examined by the members and found to be in excellent shape, considering years of service.

### *Lighting Standards Discussed*

Fred Strange of Port Angeles Concrete Products Co., Port Angeles, Wash., spoke on "Concrete Lighting Standards," advising that a quantity of standards had recently been turned out at his plant of selected aggregates, then given a muriatic acid bath. It was found that when the completed standard had been dipped for 10 minutes, then thoroughly scrubbed and then dipped another 10 minutes, that the best results were obtained, rather than dipping for 20 minutes continuously. He believed that dense well made pipe would never be affected by acids of any kind. They had been extra careful to have standards uniform, equally dividing the fine and coarse material and carefully tamped. Careful tests after one year were to be made and the data submitted in another report to the association.

Ed. Warner of E. W. Harrison Pipe Co., Tacoma, Wash., outlined the system of steam curing in use at the plant. Three new kilns have recently been built, all electrically heated.

Earl Bracken, Grays Harbor Cement Products Co. of Aberdeen, Wash., called attention to changes in specifications in the state of Washington and advised that more steel and of extra strength will be required, and to illustrate showed a model of steel AC 5/10 wire welded together in what they had found to be an ideal shape and had fulfilled the specifications.

In the final session, W. P. Hews, secretary-treasurer, reported that though it had been found necessary to curtail their advertising expenditures somewhat, the association shows a balance in the treasury, and that the Washington group would continue to maintain the fellowship at the University of Washington under supervision of I. L. Collins.

W. P. Hews of Yakima Cement Products Co., Yakima, Wash., spoke on "Pressure Pipe," stating that there had been several failures of hand-made irrigation pipe in his territory, but these instances were scattered and were limited to pipe made many years ago when obsolete methods and poor aggregates had been employed. With the modern methods and recent installations there had been satisfactory reports and concrete pipe is coming into larger use.

He advised that the U. S. Department Indian Service had given two large orders in the Yakima valley, dividing this with Portland and California concerns. It was his belief that the tongue and groove type was the most popular.

Considerable regret was expressed by the assembled members that business prevented the attendance of Hans Mumm, Jr., chairman of the entertainment committee of Everett, Wash. It was unanimously decided to hold the next meeting of the association at Everett, Wash., during January, 1930.

The registration was as follows:

### *Registration*

A. J. Cota, Lewis Concrete Products, Centralia; W. J. McKenzie, Tuerck-McKenzie Co., Portland; Chas. Delling, Puyallup Shope Brick Co.; W. H. Sharp, Longview Concrete Pipe Co., Longview; L. S. Shaw, Cement Products Co., Renton; A. H. Paddock, Concrete Pipe Co., Seattle; E. B. Ballinger, Concrete Pipe Co., Seattle; C. M. Howard, Concrete Pipe Co., Tacoma; Earl Bracken, Grays Harbor Concrete, Aberdeen; Frank J. Barrett, Portland Cement Assn., Portland; E. L. Warner, Harrison Pipe Co., Tacoma; F. R. Zaugg, Concrete Masonry Units Co., Tecamo; J. D. Neville, Portland Cement Assn., Seattle; I. E. Stevenson, "Pacific Builder," Seattle; F. F. Evans, Seattle N. W. Concrete Pipe, Seattle; S. E. Paine, city engineer, Everett; W. A. Gee, Snow Mfg. Co., Los Angeles, Calif.; Chas. Fox, McMillan and Co., Portland; W. P. Hews, Yakima Cement Products, Yakima; A. B. Dean, Portland Cement Assn., Portland; G. W. Gleeson, Oregon State College, Corvallis; Prof. S. H. Graf, Oregon State College, Corvallis; S. E. Hilton, Pacific Coast Cement Co., Seattle; Ray O. Young, N. W. Portland Cement, Seattle; H. H. Haskell, ROCK PRODUCTS, Chicago; W. O. Scott, "Concrete Products," Chicago; Fred C. Strange, Port Angeles Concrete Products, Port Angeles; E. D. Whitmarsh, Olympia Concrete Products, Olympia.

## New Concrete Brick Process

A NEW method of concrete brick manufacture is described in a recent issue of the *Mining World and Engineering Record* (England). The bricks are made on an automatic machine at a 2400 per hr. rate.

The brick-making machine is primarily designed to produce facing bricks consisting of portland cement and silica sand, or other suitable material, and is capable of being adapted for the production of clay bricks. The bricks are pressed in a semi-dry state. A point to note is that bricks can be made to any specification and of any color or combination of colors, the colors being permanent and uniform throughout the bricks.

A demonstration one-unit plant has been installed at Merstham, England, and this will soon be expanded, the report states. All bricks made are of standard size; the weight is given at 5½ lb. each. Recent tests indicate their durability and strength.

British and foreign patents rights to the machine have been acquired by the Vimax Machinery Co., recently organized. In addition the Vimax company has acquired the rights in connection with the Mackenzie hydraulic press for molding concrete kerbs, channels, road setts, paving stones, blocks, slabs and other products.

## Sand-Lime Brick Production and Shipments in July

THE following data are compiled from reports received direct from 18 producers of sand-lime brick located in various parts of the United States and Canada. The number of plants reporting is six less than those furnishing statistics for the June estimate published in the July 20 issue. The statistics below may be regarded as representative of the entire industry, the reporting plants having about one-half the production capacity in the United States and Canada.

Production seems to have increased considerably, since the number of plants reporting is six less than those reporting for the month of June, and yet there is no great difference in the production figures for the two months. The same condition appears to be true in the case of rail and truck shipments, stocks on hand and unfilled orders.

The following are average prices quoted for sand-lime brick in July:

***Average Prices for July***

| Shipping Point | Plant Price | Delivered |
|---|---|---|
| Boston, Mass. | $12.00 | $16.00 |
| Buffalo, N. Y. | 12.25 | 16.50 |
| Dayton, Ohio | 12.50 | 15.50 |
| Detroit, Mich. | ..... | 15.50@16.00 |
| Detroit, Mich. | 13.00@14.00 | 15.00@16.60 |
| Detroit, Mich. | ..... | 16.00 |
| Grand Rapids, Mich. | 12.50 | ..... |
| Madison, Wis. | 12.00-12.50 | 13.00-14.00 |
| Milwaukee, Wis. | 10.50 | 13.00 |
| Minneapolis, Minn. | 8.25 | 10.50 |
| Mishawaka, Ind. | 10.50 | ..... |
| Pontiac, Mich. | 12.50 | 15.50 |
| Saginaw, Mich. | 12.00 | ..... |
| Syracuse, N. Y. | 18.00 | 20.00 |
| Toronto, Canada | 12.50 | 15.00 |
| Winchester, Mass. | ..... | 16.00 |

The following statistics are compiled from data received direct from 18 producers in the United States and Canada:

***Statistics for June and July***

| | †June | *July |
|---|---|---|
| Production | 17,578,000 | 16,061,000 |
| Shipments (rail) | 5,412,000 | 4,263,000 |
| Shipments (truck) | 13,757,000 | 12,266,000 |
| Stocks | 10,447,000 | 8,854,000 |
| Unfilled orders | 14,968,000 | 14,739,000 |

†Twenty-four plants reporting; incomplete, one plant not reporting production, three plants stocks on hand and 13 not reporting unfilled orders.

*Eighteen plants reporting; incomplete, one plant not reporting stocks on hand and seven not reporting unfilled orders.

***Notes From Producers***

Buffalo Sandstone Brick Co., Buffalo, N. Y., report that they have sold their brick-making machinery to the Paul Lime and Brick plant, Douglas, Ariz.

An excellent piece of advertising matter is now being mailed by the Saginaw Brick Co., Saginaw, Mich., in the shape of a replica of the report of the Detroit Testing Laboratory on tests made of five samples of their brick. The average of results obtained were: Absorption, 16.28%; compressive strength, 3508 lb. per sq. in. and modulus of rupture, 678 lb. per sq. in.

## Freezing Tests on Sand-Lime Brick

SOME preliminary experiments have been made to determine the best procedure for conducting a series of freezing tests on sand-lime brick.

Twenty-four bricks of a single manufacturer were used. They were divided into four groups, each group representing as nearly as possible an equal range of absorptions as determined by a 72-hour cold, total-immersion test. All brick were given 10 cycles of freezing and thawing, the procedure being varied for each group. Bricks of Set 1 were frozen in ½-in. of water immediately after the 72-hour soaking. Bricks of Set 2 were frozen with no surrounding water, the first freezing starting directly after the 72-hour soaking. The other two sets were both cooled each time to 0 deg. C. while totally immersed. Set 3 was then frozen in ½-in. of water and Set 4 was frozen with no surrounding water. All brick were wiped with a damp cloth and weighed after each thawing. After the 10 cycles the brick were dried to constant weight in a gas-fired oven at 110 deg. C. and reweighed.

It was found that the loss in weight of the bricks ranged from 0.3 to 2.8% of the original dry weight, and that as a rule the bricks with the higher water absorption had the lower percentage loss. The bricks of Set 2 showed a somewhat lower average percentage loss than the others, it being 1.0%. The six bricks of Set 4 were next lowest, with an average loss of 1.2%. The others showed losses of 1.5%.

The increase in water absorption was also calculated. It was found that the average increase in absorption for all the brick from the end of the 72 hours' total immersion to the end of the 10 cycles was 2.8%, the final absorption being calculated from the final dry weight. Set 1 had the largest increase, averaging 3.4%, while Set 4 had the smallest, averaging 2.2%. These results were obtained on only one make of brick, and it would be unwise to draw any conclusions from them. Similar tests on a number of makes of brick are in progress.—*Technical News Bulletin*, U. S. Bureau of Standards.

## Comparison of Soil Liming Materials

INTERESTING experiment data on the value of different soil lining materials as reported in Bulletin No. 329 recently issued by the Agricultural Experiment Station, Purdue University, Lafayette, Ind.

In the experiments reported, ground limestone of various degrees of fineness, hydrated calcium lime, hydrated magnesian lime, magnesian limestone and lake marl have been compared as to their relative efficiency and value for liming acid soils.

Ground limestone and marl are found the most practical liming materials for correcting acid soils in Indiana. The 10-mesh and 50-mesh ground limestone and marl produced as large crop increases the first year and in succeeding years as hydrated lime.

The 50-mesh limestone has been no more effective than the 10-mesh limestone, indicating that there is no advantage in grinding finer than 10-mesh. The 4-mesh limestone screenings have been less effective than the finer ground materials but may be satisfactorily used if applied in larger amounts. Coarser particles of limestone screenings had a small effect during the first few years, but after that their effectiveness increased rapidly, indicating that the coarse particles in ground limestone have a definite, even though somewhat delayed, action on the acidity of the soil.

The system of applying small amounts of lime to each grain crop is not practical, at least on such acid soils as are represented on the fields used in these experiments.

Hydrated magnesian lime has proven fully as effective as pure calcium lime. The comparison of the 1.5-ton to 2-ton applications with the 3-ton to 4-ton applications indicates that if only a limited investment in liming can be made at one time, it will be more profitable per dollar invested to lime twice as many acres at the lighter rate until the whole farm is limed and then go back and make another similar application.

The extremely heavy applications of ground limestone have produced no ill effects and there seems to be no danger of overliming these soils. Laboratory tests on limed and unlimed plots show that with the moderate applications the lime has affected the acidity of the soil only in the surface layer.

## Highway Delegation from U. S. at Pan-American Congress

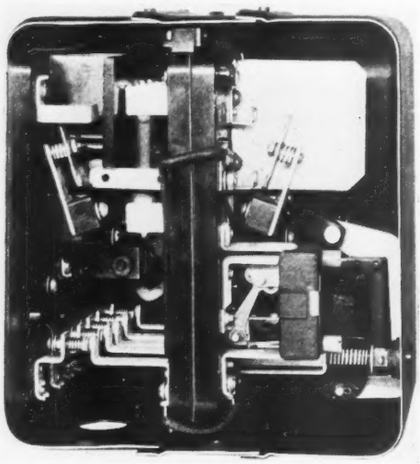
AN OFFICIAL delegation from the United States to the second Pan-American Congress of Highways sailed recently from Hoboken, N. J., for Rio de Janeiro, Brazil, according to an announcement by the Bureau of Public Roads, United States Department of Agriculture. The congress is scheduled in that city for August 16-31.

The representatives were appointed by the President and include J. Walter Drake, former assistant Secretary of Commerce, chairman; Thomas H. MacDonald, chief of the Bureau of Public Roads; H. H. Rice, assistant to the president of General Motors Corp., and chairman of the United States delegation to the first Pan-American Congress of Highways; Senator Tasker L. Oddie of Nevada; Congressman Cyrenus Cole of Iowa; Frank T. Sheets, chief engineer of department of public works and buildings of Illinois, and Frederic A. Reimer, president of the American Road Builders Association. Pyke Johnson of the National Automobile Chamber of Commerce will accompany the delegates as executive secretary.

# New Machinery and Equipment

## New Switch Does Work of Three Devices

A NEW SWITCH, CR-7006-F-1, announced by the General Electric Co., is said to take the place of the magnetic switch, motor circuit switch and enclosed fuses usually required in controlling the operation of a motor. This switch can be applied to control any motor where a general-purpose magnetic switch would be used, and where its special features are desirable. It is compact, easily accessible and readily installed.



***New switch designed to do work of Three Devices***

The switch consists of three sections: a back portion containing a motor circuit switch, a middle portion containing a base on the front of which the magnetic switch is mounted and on the back of which clips are provided for fuses, and the front cover. The back portion is built for mounting directly on a wall. No flexible connections are used between sections.

As a result of this construction, the switch mechanism may be very easily and quickly removed from the mounting in case of trouble or for inspection purposes. At such a time the middle section of the switch is taken out and a spare section substituted, the only tool necessary being a screwdriver or a dime, the manufacturers state.

The switch is also designed to allow removal and substitution of spare mechanisms with safety to the operator. A guard over the incoming line terminal prevents accidental contact at such times. In addition, the switch cannot be removed from the back section unless the motor circuit switch is open.

Overload protection is provided by two temperature overload relays which open the contactor when overloads occur. The relays are so designed that they will trip the contact mechanism just before the overload will cause the motor to be excessively heated.

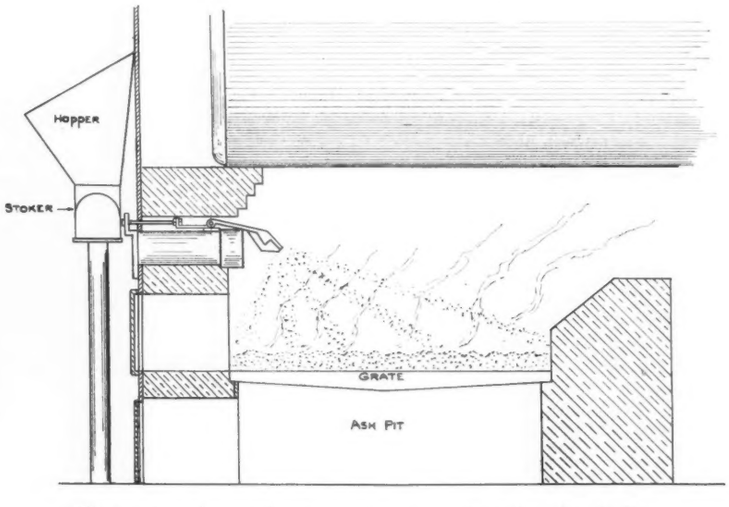
The switch is furnished with a holding interlock which permits its use with a "Start-Stop," momentary-contact, push-button station. When such a push-button station is used, if the voltage fails, the contactor will open and will not close automatically on return of voltage, making it necessary to press the "Start" button to restart the motor.

## Small Stoker for Boilers

AN IMPROVED design of small stoker for boiler installation is offered by Arnold and Weigel, Inc., Woodville, Ohio. The machine, known as the "Lima-Ward" stoker, can be inexpensively applied to any boiler, the manufacturers say, for it is designed not to interfere with fire or ash doors, grates or the like. It is particularly efficient with the lower priced grades of fuel, such as bituminous screenings, according to the makers.

Some of the advantages claimed for the new stoker are: Simplicity of design and operation; easily accessible; low installation cost without extensive changes to fire box or grates; no obstruction to the fire door; will swing away from the boiler front for cleaning flues, or for making other boiler repairs; will maintain a uniform pre-determined steam pressure; will burn the cheaper grades of bituminous coal at a distinct saving; releases fireman for other duties.

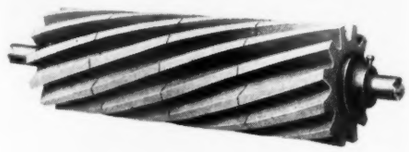
The accompanying illustration show a general application of this stoker.




***Illustrating the application of new small stoker for boilers***

## Belt Conveyor Cleaner

A RUBBER "squeegee" has been brought out by the Robins Conveying Belt Co., New York, to remove the dirt from the underside of conveying belts. It consists of a series of spiral flutes made of high grade rubber. The roll is 7½ in. outside diameter and made up in sections 6 in. long. The sections are mounted on a wooden core and the rubber brush is to be mounted on the same driving mechanism as now used on Robins brush cleaners.



***Rubber squeegee for cleaning conveyor belts***

The rubber cleaner turns with a peripheral speed of about 1000 f.p.m. The wearing part is about ¾ in. deep. The spiral shape of the flutes is said to prevent the belt from flopping up and down.

This rubber cleaner is located far enough back of the head pulley so that the belt is straightened out from its crowning over the head pulley. This makes the cleaner effective throughout the entire width of the belt.

One of the advantages claimed for this rubber cleaner brush is that it bears very lightly against the belt, thus preserving not only its own life but that of the belt. At least 1000 hours of service can be obtained from the cleaner, according to the makers.

## New Clamshell Bucket

THE Erie Steel Construction Co., Erie, Penn., has designed a new digging bucket that can be adjusted for the kind of material being dug. The new bucket is named "Multi-Power" from its working action, which is a combination of the multiple rope and lever arm principles.

This new bucket can be rigged up with 2, 3, 4, 5 or 6 parts of line. The scoops are claimed to be oversize with but little added bucket weight. Counterweights in 100 lb. units can be added by one man. They are attached to the bucket by two bolts and can be put on or taken off in a few minutes, the manufacturers say.

In addition to these major features, the manufacturers state that the stops are improved, relocated and longer—so designed to add reinforcement to the power arm. The main bearing is also wider.

All ropes end in wedge and socket. Roller bearings can be furnished in the power arm sheaves at no extra cost. Stellite can be applied to the lips at a slight additional cost. Teeth are of the self-burying chisel point type. The sheaves are of steel and are kept clean by special sheave cleaners. Lubrication is by the Alemite system.

***Adjustable digging bucket***

## Automatic Flow Control at High Temperatures and Pressures

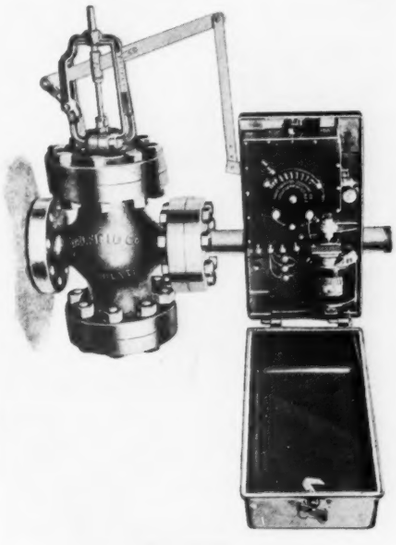
ACCURATE measurement of flow at high temperatures and high pressures is an important part of the general problem of high pressures now commanding much attention in the field of steam plant design and in other applications as well. One of the latest installations of this character handled by the Brown Instrument Co. employs the valve shown in the above illustration.

This valve is designed to control automatically the feeding of hot oil to a petroleum cracking still and is built to operate at 1300 lb. pressure and 600 deg. F. temperature. This valve in the still feeder line is controlled by the setting of a Brown automatic control flow recorder located on the instrument panel of the control house, which may be any distance from the still.

This installation is typical of many applications to the control of steam, water, process liquors, gases, etc.

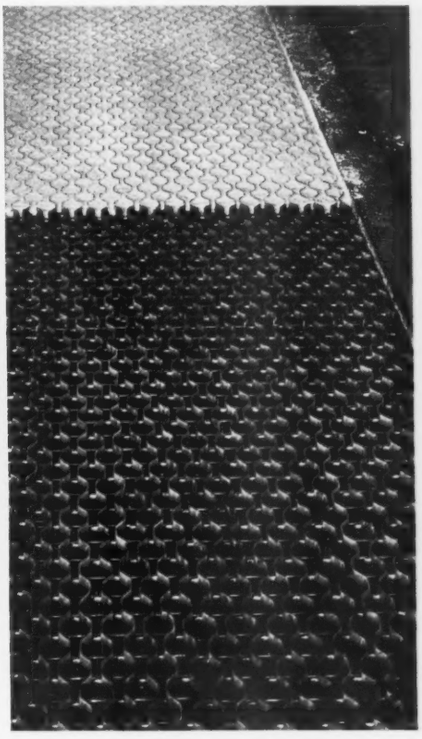
## New Surface Armoring for Concrete Floors

THE BLAW KNOX CO., of Pittsburgh, Penn., has announced a new type of steel armoring to be included integrally in concrete, asphalt and composition floors to make the surfaces as strong as any part of the floor, and thus to increase the useful life of the floor. This new material is called "Floorgard" and consists of a built-up continous steel mat which is laid down to form the surface of the floor. The design is such that the portions of the concrete appearing between the steel bars is in no way divided up into separate sections, but is monolithic with the rest of the concrete forming the floor body. The company claims that "Floorgard" is not only pleasing to look at, but that it is also scientifically designed to present such a surface to traffic that stresses will be taken care of by the steel itself, distributing loads throughout a wide area of floor. It is claimed that a floor of this material remains smooth and true.



***Automatic control flow recorder operates feeding valve***

To lay "Floorgard" requires no drawings nor any special tools or skill, the company states. The material consists of a number of steel strips, shaped into regular pattern which, when placed together, form a series of separate rectangles of proper size to meet the conditions under which a given floor must work. These steel strips are set on edge, as shown in the accompanying illustration. Small, short circulars tie rods act as carrying members, carrying one strip to another strip, and tie the entire surface.



***Steel surface armoring for concrete floors***

The construction is of such a nature that it can be formed to meet any floor requirement. It will be further noted in the illustration that there are small steel lugs between adjacent strips of "Floorgard" at the points where the tie rods go through the steel strips. These lugs act as anchors.

In some installations, it may be economical or necessary to protect the entire area of a factory floor. In such cases "Floorgard" is valuable as the nature of the material is such as to enable it to be laid in places and at points where wear is the heaviest. It can be easily and quickly cut in the field to fit around machine bases.

## Improved Grade of Chilled Iron

WHAT IS claimed to be a superior grade of chilled iron is now being marketed under the name of "Elverite" by the Fuller-Lehigh Co., Fullerton, Penn. The new product has been thus named in tribute to J. S. Elverson, metallurgist for the Lehigh company, under whose direction it was developed.

# Super-Capacity Bucket Elevators

By R. A. Shilbauer
Advertising Manager, Chain Belt Co., Milwaukee, Wis.

THE distributing plant at Milwaukee, Wis., built by the Huron Portland Cement Co. of Detroit, was put in operation in 1924 handling "High Grade" portland cement manufactured at the Huron company's plant at Alpena, Mich. This main producing plant has a manufacturing capacity of 15,000 bbl. per day. Cement from the Alpena mill is transported in bulk to the Milwaukee plant, one of five distributing plants on the Great Lakes, in the Huron company's own privately owned and operated steamboats equipped with self-unloading devices.

At each of the distributing plants, Huron cement is unloaded and deposited into silo storage bins for shipment as ordered by dealers and contractors. Practically all deliveries of cement to the construction job are made in sacks. The cement is reclaimed from the storage bins, sacked by automatic machines and loaded on to cars or trucks.

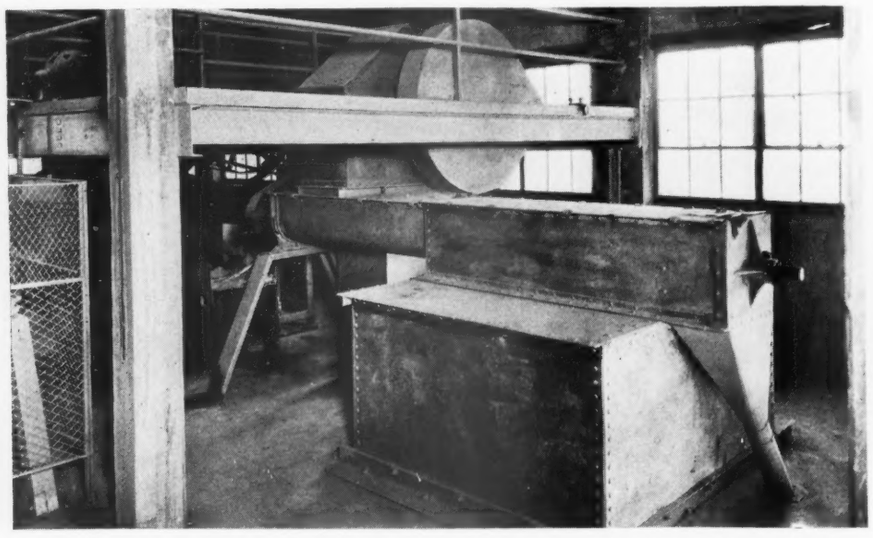
At the Milwaukee plant three packing machines are in use at the present time. Additions now being made will increase the number of machines to five units with a total capacity of 11,600 bbl., or 46,400 sacks per 10-hour day. The silo storage has been increased to a battery of 20 silos.

The Milwaukee plant is located on the water front, which permits unloading the bulk cement from the bulk carrying boats and depositing it directly into the silo storage bins. The Huron company's cement boats have a capacity for self-unloading which enables them to discharge their cargoes of bulk cement in 18 hours.

The bulk cement unloaded by the boats is discharged by elevators and distributing conveyors into the storage silos, from which it is again reclaimed for shipment and elevated to small bins over the packing machines. As the sacks are filled they are automatically discharged by the packer on to flat belt conveyors, which carry them to the different truck loading points or into the box car for shipment by rail.

The Rex "Super-Capacity" bucket elevator in which the cement is elevated from the dock for distribution into the storage bins is vertical with shaft centers about 80 ft. apart. It consists of heavy steel buckets 13 in. wide and 36 in. long mounted on two strands of Chabelco steel bushed roller chain with 4-in. dia. chilled faced rollers and running at a speed of 100 f.p.m. This elevator handles almost 300 tons of bulk cement per hour, sufficient to supply cement for all the silos and eventually for all the bagging units and three loading points for bulk cement.

***Foot-end of the bucket elevator***



***Head-end of one of the two elevators feeding bins above the packers***

***Head-end of bucket elevator; the two-way spout feeds cement to the screw conveyors that distribute it to silos***

As the cement leaves the elevator at the upper level it is distributed to the various silos by a system of screw conveyors so designed that the cement can be discharged into any one or several silos at one time.

Cement for packing and shipping is reclaimed from the silos through an opening in the bottom of each with a rack and pinion gate that controls the flow into the conveyors that carry it to two other Rex bucket elevators. These elevators discharge into the bins over the packing machines. They have 45-ft. vertical shaft centers and are made up of malleable iron buckets 20 in. long and 9 in. wide mounted on Rex combination steel and malleable chain running 100 f.p.m.

One of the elevators designed for a capacity of 30 tons per hour carried 50 to 60 tons per hour over a 10-hour period for several successive days last season. The overhead bins into which they discharge have a capacity of 600 sacks of cement each. They feed the bagging machines, each of which is operated by two men and each capable of filling 1000 to 1200 sacks per hour.

The filled bags are discharged from the machines on to the flat belt conveyor system that distributes them to five loading points, when required. As it is good practice to store a large quantity of cement only in bulk, the bagging machines are operated only when trucks or cars are being loaded.

To handle the bundles of empty cement bags returned to the Milwaukee plant, the Huron company has installed a Rex tray elevator which transports these returned sacks from the receiving point to the third floor of the plant. Here they are sorted and cleaned. The sacks received in good condition are ready for immediate use.

The elevating equipment installed at the Milwaukee plant of the Huron company was furnished by the Chain Belt Co. of Milwaukee, Wis. The main installation has been in service for five years and has successfully withstood the severe conditions encountered.

# The Rock Products Market

## Wholesale Prices of Crushed Stone

**Prices given are per ton, F.O.B., at producing point or nearest shipping point**

### Crushed Limestone

| City or shipping point | Screenings, ¼ inch down | ½ inch and less | ¾ inch and less | 1½ inch and less | 2½ inch and less | 3 inch and larger |
|---|---|---|---|---|---|---|
| **EASTERN:** | | | | | | |
| Buffalo, N. Y. | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 |
| Bound Brook, N. J. | 1.35 | 2.10 | 1.90 | 1.50 | 1.50 | ..... |
| Chaumont, N. Y. | .50 | 1.75 | 1.75 | 1.50 | 1.50 | 1.50 |
| Chazy, N. Y. | .75 | 1.75 | 1.60 | 1.30 | 1.30 | 1.30 |
| Dundas, Ont. | .53 | 1.05 | 1.05 | .90 | .90 | .90 |
| Farmington, Conn. | ..... | 1.30 | 1.10 | 1.00 | 1.00 | ..... |
| Frederick, Md. | .50– .75 | 1.35–1.45 | 1.15–1.25 | 1.10–1.20 | 1.05–1.15 | 1.05–1.10 |
| Ft. Springs, W. Va. | .40 | 1.35 | 1.35 | 1.35 | 1.25 | 1.15 |
| Munns, N. Y. | .75 | 1.00 | 1.00 | 1.00 | ..... | ..... |
| Prospect, N. Y. | .80 | 1.20 | 1.20 | 1.15 | 1.10 | ..... |
| Rochester, N. Y.—Dolomite | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 |
| St. Vincent de Paul, Que. (n) | .65 | 1.25 | 1.05 | .95 | .85 | 1.00 |
| Shaw's Junction, Penn. | .85e | ..... | 1.35e | 1.35e | 1.35e | 1.35e |
| Syracuse, N. Y. | .50 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Watertown, N. Y. | 1.00 | 1.75 | 1.75 | 1.50 | 1.50 | 1.50 |
| Western New York | .85 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| **CENTRAL:** | | | | | | |
| Afton, Mich. | ..... | ..... | ..... | .50 | ..... | 1.50 |
| Alton, Ill. | 1.85 | ..... | 1.85 | ..... | ..... | ..... |
| Cape Girardeau, Mo. | 1.25 | 1.25 | 1.25 | 1.25 | 1.00 | ..... |
| Columbia and Krause, Ill. | 1.05–1.40 | .95–1.50 | 1.15–1.50 | 1.05–1.50 | 1.05–1.50 | ..... |
| Cypress, Ill. | 1.60 | 1.00 | 1.10 | 1.00 | 1.00 | 1.25 |
| Davenport, Iowa (f) | 1.00 | 1.50 | 1.50 | 1.30 | 1.30 | 1.40 |
| Dubuque, Iowa | .95 | .95 | .95 | 1.10 | 1.10 | 1.10 |
| Stolle and Falling Springs, Ill. | 1.05–1.70 | .95–1.70 | 1.15–1.70 | 1.05 1.70 | 1.05–1.70 | ..... |
| Greencastle, Ind. | 1.25 | 1.10 | 1.10 | 1.10 | 1.00 | 1.00 |
| Lannon, Wis. | 1.00 | 1.00 | 1.00 | .90 | .90 | .90 |
| McCook, Ill. | 1.00 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Marblehead, Ohio (l) | .55 | .80 | .80 | .80 | .80 | .80 |
| Milltown, Ind. | ..... | .90–1.00 | 1.00–1.10 | .90–1.00 | .85– .90 | .85– .90 |
| Northern Ohio points | .85–1.15 | 1.25 | 1.15 | 1.15 | 1.15 | 1.15 |
| Sheboygan, Wis. | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| Stone City, Iowa | .75 | ..... | 1.20 | 1.00 | 1.00 | ..... |
| Thornton, Ill. | .90 | 1.00 | 1.25 | 1.25 | 1.25 | 1.25 |
| Toledo, Ohio | 1.10 | 1.70 | 1.70 | 1.70 | 1.70 | 1.70 |
| Toronto, Canada | 2.50 | 3.00 | 2.85 | 2.85 | 2.85 | 2.85 |
| Valmeyer, Ill. (fluxing limestone) | .90–1.20 | ..... | ..... | 1.75 | ..... | 1.75 |
| Waukesha, Wis. | .90 | ..... | .90 | .90 | .90 | .90 |
| Winona, Minn. | 1.00 | 1.20 | 1.30 | 1.40 | 1.40 | 1.40 |
| Wisconsin points | .50 | ..... | 1.00 | .90 | .90 | ..... |
| Youngstown, Ohio | 1.00 | 1.00 | 1.25 | 1.25 | 1.25 | 1.25 |
| **SOUTHERN:** | | | | | | |
| Cartersville, Ga. | 1.00 | 1.65 | 1.65 | 1.35 | 1.15 | 1.15 |
| Chico, Texas | 1.00 | 1.30 | 1.30 | 1.25 | 1.20 | ..... |
| Cutler, Fla. | ..... | .50– .75r | ..... | 1.50–1.75r | ..... | 1.10r |
| El Paso, Texas (r) | .75–1.00 | 1.00–1.25 | 1.00–1.25 | 1.00 | 1.00 | 1.00 |
| Graystone, Ala. | Crusher run, screened, $1 per ton | | | | | |
| Olive Hill, Ky. | .90 | 1.00 | 1.00 | .90 | .90 | .90 |
| Rocky Point, Va. | .50– .75 | 1.40–1.60 | 1.30–1.40 | 1.15–1.25 | 1.10–1.20 | 1.00–1.05 |
| **WESTERN:** | | | | | | |
| Atchison, Kan. | .50 | 1.80 | 1.80 | 1.80 | 1.80 | 1.70 |
| Blue Springs and Wymore, Neb. | .25 | 1.45 | 1.45 | 1.35c | 1.25d | 1.20 |
| Cape Girardeau, Mo. | 1.00 | 1.25 | 1.25 | 1.25 | 1.00 | ..... |
| Rock Hill, St. Louis, Mo. | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 |

### Crushed Trap Rock

| City or shipping point | Screenings, ¼ inch down | ½ inch and less | ¾ inch and less | 1½ inch and less | 2½ inch and less | 3 inch and larger |
|---|---|---|---|---|---|---|
| Birdsboro, Penn. (q) | 1.20 | 1.60 | 1.45 | 1.35 | ..... | 1.30 |
| Branford, Conn. | .80 | 1.70 | 1.45 | 1.20 | 1.05 | ..... |
| Chico, Texas | 2.50 | 2.25 | 1.55 | 1.25 | 1.10 | ..... |
| Eastern Maryland | 1.00 | 1.60 | 1.60 | 1.50 | 1.35 | 1.35 |
| Eastern Massachusetts | .85 | 1.75 | 1.75 | 1.25 | 1.25 | 1.25 |
| Eastern New York | .75 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Eastern Pennsylvania | 1.10 | 1.70 | 1.60 | 1.50 | 1.35 | 1.35 |
| Knippa, Texas | 2.50 | 2.00 | 1.55 | 1.25 | 1.25 | 1.25 |
| New Britain, Plainville, Rocky Hill, Wallingford, Meriden, Mt. Carmel, Conn. | .80 | 1.70 | 1.45 | 1.20 | 1.05 | ..... |
| Northern New Jersey | 1.35–1.40 | 2.10 | 1.80–1.90 | 1.50–1.60 | 1.40–1.60 | ..... |
| Richmond, Calif. | .75 | ..... | 1.00 | 1.00 | 1.00 | ..... |
| Spring Valley, Calif. | .90–1.25 | .90–1.25 | .90–1.25 | .90–1.25 | .90–1.25 | .90–1.25 |
| Springfield, N. J. | 1.40 | 2.00 | 1.90 | 1.60 | 1.60 | ..... |
| Toronto, Canada | ..... | 5.80 | 4.05 | ..... | ..... | ..... |
| Westfield, Mass. | .60 | 1.50 | 1.35 | 1.20 | 1.10 | ..... |

### Miscellaneous Crushed Stone

| City or shipping point | Screenings, ¼ inch down | ½ inch and less | ¾ inch and less | 1½ inch and less | 2½ inch and less | 3 inch and larger |
|---|---|---|---|---|---|---|
| Berlin, Utley, Montello and Red Granite, Wis.—Granite | 1.80 | 1.70 | 1.50 | 1.40 | 1.40 | ..... |
| Cayce, S. C.—Granite | ..... | ..... | 1.75 | 1.75 | 1.60 | ..... |
| Eastern Pennsylvania—Sandstone | 1.35 | 1.70 | 1.65 | 1.40 | 1.40 | 1.40 |
| Eastern Pennsylvania—Quartzite | 1.20 | 1.35 | 1.25 | 1.20 | 1.20 | 1.20 |
| Emathla, Fla.—Flint rock | ..... | ..... | 2.25–2.50s | ..... | ..... | ..... |
| Lithonia, Ga.—Granite | .75 | 1.75 | 1.60 | 1.25 | 1.25 | ..... |
| Lohrville, Wis.—Granite | 1.65 | 1.70 | 1.65 | 1.45 | 1.50 | ..... |
| Middlebrook, Mo. | 3.00–3.50 | ..... | 2.00–2.25 | 2.00–2.25 | ..... | 1.25–3.00 |
| Richmond, Calif.—Quartzite | .75 | ..... | 1.00 | 1.00 | 1.00 | ..... |
| Somerset, Penn. (sand-rock) | | | 1.50 to 1.85 | | | |
| Toccoa, Ga.—Granite | 1.50 | ..... | 1.50 | 1.35 | 1.30 | 1.25 |

(a) Sand. (b) to ⅛ in. (c) 1 in., 1.40. (d) 2 in., 1.30. (e) Price net after 10c cash discount deducted. (f) High calcite fluxing limestone, 92–98% CaCO, 1.75. (g) Run of quarry. (h) Less 10c discount. (j) Less 10% net ton. (k) Rubble stone. (l) Less .05. (n) Ballast R. R., .90; run of crusher, 1.00. (p) Carload prices. (q) Crusher run, 1.40; ¼-in. granolithic finish, 3.00. (r) Cubic yard. (s) 1-in. and less, per cubic yard.

## Agricultural Limestone

**(Pulverized)**

| | |
|---|---|
| Alton, Ill.—Analysis, 99% $CaCO_3$; .03% $MgCO_3$; 90% thru 100 mesh | 5.00 |
| Bettendorf and Moline, Ill.—Analysis, $CaCO_3$, 97%; 2% $MgCO_3$; 50% thru 100 mesh, 1.50; 50% thru 4 mesh | 1.50 |
| Blackwater, Mo.—100% thru 4 mesh | 1.00 |
| Branchton, Penn.—100% thru 20 mesh, 60% thru 100 mesh, 45% thru 200 mesh | a5.00 |
| Cape Girardeau, Mo.—Analysis, $CaCO_3$, 94½%; $MgCO_3$, 3½%; 90% thru 50 mesh | 1.50 |
| Cartersville, Ga.—90% thru 100 mesh, 2.00; 50% thru 50 mesh | 1.50 |
| Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk | 2.50 |
| Cypress, Ill.—Analysis, 94-98% $CaCO_3$, 2% $MgCO_3$; 90% thru 100 mesh, 1.35; 50% thru 100 mesh, 1.15; 90% thru 50 mesh, 1.15; 50% thru 50 mesh, 1.05; 90% thru 4 mesh, 1.10; 50% thru 4 mesh | 1.00 |
| Danbury, Conn., and West Stockbridge, Mass.—Analysis, 90% $CaCO_3$; 5% $MgCO_3$; fine ground, 90% thru 100 mesh; bulk | 3.50 |
| Paper bags | 4.75 |
| 100-lb. cloth bags | 5.25 |
| (All prices less .25 cash 15 days) | |
| Davenport, Ia.—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 90% thru 200 mesh, bags, per ton | 6.00 |
| 90% thru 20 mesh, bulk, per ton | 1.50 |
| Hillsville, Penn.—Analysis, 94% $CaCO_3$; 1.40% $MgCO_3$; 75% thru 100 mesh; sacked | 5.00 |
| Jamesville, N. Y.—Analysis, 89% $CaCO_3$, 4% $MgCO_3$; pulverized; bags, 4.25; bulk | 2.75 |
| Joliet, Ill.—Analysis, 52% $CaCO_3$; 48% $MgCO_3$; 90% thru 100 mesh | 3.50 |
| Knoxville, Tenn.—Analysis, 52% $CaCO_3$; 36% $MgCO_3$; 80% thru 100 mesh, bags, 3.75; bulk | 2.50 |
| Marlbrook, Va.—Analysis, 80% $CaCO_3$; 10% $MgCO_3$; bulk | 1.75 |
| Marl — Analysis, 95% $CaCO_3$; 0% $MgCO_3$; bulk | 2.25 |
| Marion, Va.—Analysis, 90% $CaCO_3$, 2% $MgCO_3$; per ton | 2.00 |
| Middlebury, Vt.—Analysis, 99.05% $CaCO_3$; 90% thru 50 mesh | 4.25 |
| Milltown, Ind.—Analysis, 94.50% $CaCO_3$, 33% thru 50 mesh, 40% thru 50 mesh; bulk | 1.35–1.60 |
| Olive Hill, Ky.—Analysis, $CaCO_3$ 94-98%; 50% & 90% thru 4 mesh | 1.00 |
| Piqua, Ohio—Total neutralizing power 101.12%; 60% thru 100 mesh | 2.50 |
| 100% thru 10, 90% thru 50, 70% thru 100; bags, 5.00; bulk | 3.50 |
| 100% thru 4, 30% thru 100, bulk | 1.50 |
| Rocky Point, Va. — Analysis, $CaCO_3$, 97%; $MgCO_3$, 75%; 50% thru 200 mesh, burlap bags, 3.50; paper, 3.25; bulk | 2.00 |
| Watertown, N. Y. — Analysis, 53.72% $CaCO_3$; pulverized; sacks, 4.25; bulk | 2.75 |

(a) Less 50c comm. to dealers per ton.

## Agricultural Limestone

**(Crushed)**

| | |
|---|---|
| Bedford, Ind.—Analysis, 98% $CaCO_3$; 1% $MgCO_3$; 90% thru 10 mesh | 1.50 |
| 30% thru 100 mesh | 1.50 |

(Continued on next page)

## Agricultural Limestone

Cape Girardeau, Mo.—Analysis, 94½% $CaCO_3$, 3½% $MgCO_3$; 50% thru 50 mesh ..... 1.50
Chico and Bridgeport, Tex. — Analysis, 95% $CaCO_3$; 1.3% $MgCO_3$; 90% thru 4 mesh ..... 1.00–1.25
Charles-Town, W. Va.—Lime Marl—Analysis, 95% $CaCO_3$, 50% thru 100 mesh, bulk, 3.00; including burlap bags ..... 4.50
Colton, Calif.—100% thru 16 mesh, bulk, 4.00; including sacks ..... 5.00
Davenport, Ia.—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 90% thru 10 mesh, per ton ..... 1.25
90% thru 4 mesh, per ton ..... 1.10
Dubuque, Iowa—Analysis, 54% $CaCO_3$; 38% $MgCO_3$; 90% thru 50 mesh ..... .95
Dundas, Ont.—Analysis, 54% $CaCO_3$; $MgCO_3$, 43%; 50% thru 50 mesh ..... 1.00
Ft. Spring, W. Va. — Analysis, 90% $CaCO_3$; 4% $MgCO_3$; 50% thru 100 mesh ..... 1.50
Hillsville, Penn.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$; 75% thru 100 mesh, sacked ..... 5.00
Kansas City, Mo.—50% thru 100 mesh .... 1.00
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh ..... 2.00
Screenings (¼ in. to dust) ..... 1.00
Marblehead, Ohio—90% thru 100 mesh .... 3.00
90% thru 50 mesh ..... 2.00
90% thru 4 mesh ..... 1.00
McCook, Ill.—90% thru 4 mesh ..... .95
Middlepoint, Bellevue, Bloomville, Kenton and Whitehouse, Ohio; Monroe, Mich.; Bluffton, Greencastle and Kokomo, Ind. —85% thru 10 mesh, 25% thru 100 mesh ..... 1.50
Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh 1.50
Mountville, Va. — Analysis, 76.60% $CaCO_3$; $MgCO_3$, 22.83%, 100% thru 20 mesh; 50% thru 100 mesh, paper bags, 4.50; burlap bags ..... 5.00
Stolle and Falling Springs, Ill.—Analysis, 89.9% $CaCO_3$, 3.8% $MgCO_3$; 90% thru 4 mesh ..... 1.15–1.70
Stone City, Iowa — Analysis, 98% $CaCO_3$; 50% thru 50 mesh ..... .75
West Stockbridge, Mass.—Analysis, 95% $CaCO_3$; 50% thru 50 mesh, bulk ..... 3.50
100 lb. paper bags, 4.25*; cloth ..... 5.25
Waukesha, Wis.—90% thru 100 mesh, 4.50; 50% thru 100 mesh ..... 2.10
Valmeyer, Ill.—Analysis, 96% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh ..... 1.10–1.70
*Less 25c cash 15 days.

## Pulverized Limestone for Coal Operators

Davenport, Ia.—Analysis 97% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; paper sacks ..... 6.00
Hillsville, Penn., sacks, 5.10; bulk ..... 3.50
Joliet, Ill.—Analysis, 52% $CaCO_3$; 48% $MgCO_3$; 95% thru 100 mesh; paper bags (bags extra) ..... 3.50
Marblehead, Ohio — Analysis, 83.54% $CaCO_3$; 14.92% $MgCO_3$; 99.8% thru 100 mesh; sacks ..... 4.25
Piqua, Ohio—99% thru 100 mesh, bulk, 3.50; in 80-lb. bags (f.o.b. Piqua) ..... 5.00
Rocky Point, Va.—Analysis, 97% $CaCO_3$; 75% $MgCO_3$; 85% thru 200 mesh, bulk ..... 2.25–3.50
Shaw's Junction, Penn.—Analysis, 91.55% $CaCO_3$; 96% $MgCO_3$; 70% thru 100 mesh, bulk ..... 4.50
Waukesha, Wis.—90% thru 100 mesh, bulk ..... 4.50

## Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Cedarville and S. Vineland, N. J. ..... *1.75–2.25
Cheshire, Mass., in carload lots ..... 5.00–7.00
Estill Springs and Sewanee, Tenn. ..... 1.50
Franklin, Penn. ..... 2.00
Klondike, Mo. ..... 2.00
Massillon, Ohio ..... 3.00
Michigan City, Ind. ..... .30– .35
Ohlton, Ohio ..... 2.50
Ottawa, Ill. ..... 1.25
Red Wing, Minn. ..... 1.50
San Francisco, Calif. ..... 4.00–5.00
Silica and Mendota, Va. ..... 2.00
St. Louis, Mo. ..... 2.00
Utica and Ottawa, Ill. ..... .75–1.00
Zanesville, Ohio ..... 2.50

## Miscellaneous Sands

| City or shipping point | Roofing sand | Traction |
|---|---|---|
| Beach City, Ohio | | 1.50 |
| Dresden, Ohio | | 1.25 |
| Eau Claire, Wis. | 4.30 | .40–1.00 |
| Estill Springs and Sewanee, Tenn. | 1.35–1.50 | 1.35–1.50 |
| Franklin, Penn. | | 1.75 |
| Massillon, Ohio | | 2.00 |
| Michigan City, Ind. | | .30 |

(Continued on next page)

# Wholesale Prices of Sand and Gravel

**Prices given are per ton, F.O.B., producing plant or nearest shipping point**

## Washed Sand and Gravel

| City or shipping point | Fine Sand, 1/10 in. down | Sand, ¼ in. and less | Gravel, ½ in. and less | Gravel, 1 in. and less | Gravel, 1½ in. and less | Gravel, 2 in. and less |
|---|---|---|---|---|---|---|
| **EASTERN:** | | | | | | |
| Asbury Park, Farmingdale, Spring Lake and Wayside, N. J. | .50 | .50 | 1.15 | 1.25 | 1.25 | ..... |
| Attica and Franklinville, N. Y. | .75 | .75 | .75 | .75 | .75 | .75 |
| Boston, Mass.‡ | 1.40 | 1.40 | 2.25 | ..... | 2.25 | 2.25 |
| Buffalo, N. Y. | 1.00 | 1.05 | 1.05 | ..... | ..... | ..... |
| Erie, Penn. | .60 | .85 | 1.30 | 1.30 | 1.30 | ..... |
| Leeds Junction, Me. | ..... | .50 | 1.75 | ..... | 1.25 | 1.00 |
| Machias Jct., N. Y. | .75 | .75 | .75 | ..... | .75 | .75 |
| Milton, N. H. | ..... | .50 | ..... | ..... | ..... | .90 |
| Montoursville, Penn. | 1.00 | .75 | .60 | .60 | .60 | .60 |
| Morrisville, Penn. | .50 | .40 | .90 | 1.00 | 1.00 | ..... |
| Northern New Jersey | .40– .50 | .40– .50 | 1.25 | ..... | 1.25 | ..... |
| Somerset, Penn. | ..... | 2.00 | ..... | ..... | ..... | ..... |
| South Portland, Me. | ..... | 1.00 | 2.25 | ..... | ..... | 2.00 |
| Troy, N. Y. | .50– .75* | .50– .75* | .80–1.00* | .80–1.00* | ..... | .80–1.00* |
| F. o. b. boat, per yd. | 1.50 | 1.50 | 1.75 | 1.75 | ..... | 1.75 |
| Washington, D. C. | .60 | .60 | 1.20 | 1.20 | 1.00 | 1.00 |
| Georgetown, D. C. | .55 | .55 | 1.20 | 1.20 | 1.00 | 1.00 |
| **CENTRAL:** | | | | | | |
| Algonquin, Ill. | .50 | .35 | .25 | .45 | .45 | .50 |
| Appleton, Minn. | ..... | .50 | 1.25 | ..... | 1.50 | ..... |
| Attica, Ind. | ..... | ..... | All sizes .75–.85 | ..... | ..... | ..... |
| Barton, Wis. | ..... | .40s | .50s | .65s | .65s | .65s |
| Chicago, Ill. | .50 | .50–1.45n | .60 | .60–1.55n | .60 | .60–1.90n |
| Chicago, Ill. | .30 | .20 | .30 | .40 | .40 | .45 |
| Columbus, Ohio | ..... | .75‖ | .75‖ | .75‖ | .75‖ | ..... |
| Des Moines, Iowa | .60 | .60 | 1.50 | 1.50 | 1.50 | 1.50 |
| Eau Claire, Chippewa Falls, Wis. | .40 | .40 | .55 | .85 | .85 | ..... |
| Elkhart Lake and Glenbeulah, Wis. | .50 | .30 | .30 | .50 | .50 | .60 |
| Ferrysburg, Mich. | ..... | .50– .80 | .60–1.00 | .60–1.00 | ..... | .50–1.25 |
| Grand Haven, Mich. | ..... | .60 | ..... | .90 | ..... | .90 |
| Grand Rapids, Mich. | .50 | .50 | .90 | .80 | .70 | .70 |
| Hamilton, Ohio | ..... | .85 | .85 | ..... | .85 | ..... |
| Hersey, Mich. | ..... | .50 | ..... | .60 | .75 | .75 |
| Humboldt, Iowa | .50 | .50 | 1.40 | 1.40 | 1.40 | 1.40 |
| Indianapolis, Ind. | .50– .75 | .40– .60 | .50– .75 | .50– .75 | .60– .85 | .60– .85 |
| Mankato, Minn. (h) | .55 | .45 | ..... | ..... | 1.25 | ..... |
| Mason City, Iowa | ..... | .60 | .85 | 1.25 | 1.25 | 1.25 |
| Mattoon, Ill. | ..... | ..... | .75–.85 all sizes | ..... | ..... | ..... |
| Milwaukee, Wis. | .91 | .91 | 1.06 | 1.06 | 1.06 | 1.06 |
| Minneapolis, Minn. (g) | .35 | .35 | 1.35 | 1.35 | 1.35 | 1.25 |
| St. Louis, Mo. (b) | 1.30e | 1.30f | 1.55t | 1.55 | 1.55 | 1.65 |
| St. Louis, Mo.† | 2.00e | 2.00f | 2.25t | 2.25 | 2.25 | 2.35 |
| St. Paul, Minn. | .35 | .35 | 1.25 | 1.25 | 1.25 | 1.25 |
| Terre Haute, Ind. | .75 | .60 | .75 | .75 | .75 | .75 |
| Waukesha, Wis. | ..... | .45 | .60 | .60 | .65 | .65 |
| Winona, Minn. | .40 | .40 | .50 | 1.10 | 1.10 | 1.25 |
| **SOUTHERN:** | | | | | | |
| Brewster, Fla. | .50 | .50 | ..... | ..... | ..... | ..... |
| Brookhaven, Miss. | 1.25 | .70 | 1.25 | 1.00 | .70 | .70 |
| Charleston, W. Va. | ..... | ..... | River sand and gravel, all sizes, 1.40 | ..... | ..... | ..... |
| Eustis, Fla. | ..... | .50 | ..... | ..... | ..... | ..... |
| Fort Worth, Texas | .75 | .85–1.00 | 1.00–1.10 | 1.00–1.10 | 1.00–1.10 | 1.00–1.10 |
| Gainesville, Texas | ..... | ..... | ..... | ..... | .55 | ..... |
| Knoxville, Tenn. | .85 | .85 | 1.50 | 1.20 | 1.20 | 1.20 |
| Macon, Ga. | .65– .90 | .65– .90 | 2.25–2.50 | 2.25–2.50 | 2.25–2.50 | 2.25–2.50 |
| New Martinsville, W. Va. | 1.10 | 1.00 | ..... | 1.30 | 1.10 | .90 |
| Roseland, La. | .30 | .30 | 1.00 | 1.00 | .80 | .80 |
| **WESTERN:** | | | | | | |
| Kansas City, Mo. | .70– .80 | .70– .75 | ..... | ..... | ..... | ..... |
| Crushton, Durbin, Kincaid, Largo, Rivas, Calif. | .10– .40 | .10– .40 | .50–1.00 | .50–1.00 | .50–1.00 | .50–1.00 |
| Los Angeles, Calif. | .10– .40 | .10– .40 | .20– .90 | .50– .90 | .50– .90 | .50– .90 |
| Oregon City, Ore. | ..... | ..... | All grades range from 1.00 to 1.50 per cu. yd. | ..... | ..... | ..... |
| Otay, Calif. | ..... | .35– .40 | .50– .60 | .50– .60 | .50– .60 | .50– .60 |
| Phoenix, Ariz. (k) | 1.25* | 1.15* | 1.50* | 1.15* | 1.15* | 1.00* |
| Pueblo, Colo. | .70 | .60 | ..... | 1.20 | ..... | 1.15 |
| Seattle, Wash. | 1.25* | 1.25* | 1.25* | 1.25* | 1.25* | 1.25* |
| Steilacoom, Wash. | .50 | .50 | .50 | .50 | .50 | .50 |

## Bank Run Sand and Gravel

| City or shipping point | Fine Sand, 1/10 in. down | Sand, ¼ in. and less | Gravel, ½ in. and less | Gravel, 1 in. and less | Gravel, 1½ in. and less | Gravel, 2 in. and less |
|---|---|---|---|---|---|---|
| Algonquin and Beloit, Wis. | ..... | ..... | .40 | ..... | ..... | ..... |
| Appleton, Minn. | .55 | ..... | ..... | ..... | ..... | ..... |
| Brookhaven, Miss. | ..... | ..... | ..... | ..... | ..... | .60 |
| Buffalo, N. Y. | 1.10 | .95 | ..... | .85 | ..... | .85 |
| Burnside, Conn. | ..... | .75* | ..... | ..... | ..... | ..... |
| Chicago, Ill. | 1.25m | ..... | ..... | .35 | ..... | ..... |
| Des Moines, Iowa | ..... | ..... | ..... | .85 | ..... | ..... |
| Dresden, Ohio | ..... | ..... | ..... | .70 | .65 | ..... |
| Eau Claire, Chippewa Falls, Wis. | ..... | ..... | ..... | ..... | .65 | ..... |
| Fort Worth, Texas | ..... | ..... | ..... | ..... | ..... | .67– .75 |
| Gainesville, Tex. | ..... | ..... | ..... | ..... | .55 | ..... |
| Grand Rapids, Mich. | ..... | ..... | ..... | .50 | ..... | ..... |
| Hamilton, Ohio | ..... | ..... | ..... | ..... | .70 | ..... |
| Hersey, Mich. | ..... | ..... | ..... | .50 | ..... | ..... |
| Indianapolis, Ind. | ..... | ..... | Mixed gravel for concrete work, at .65 | ..... | ..... | ..... |
| Macon, Ga. | .35 | ..... | ..... | ..... | ..... | ..... |
| Mankato, Minn. | .70 | ..... | ..... | ..... | ..... | ..... |
| Oregon City, Ore. | 1.25* | 1.25* | 1.25* | 1.25* | 1.25* | 1.25* |
| Roseland, La. | ..... | ..... | ..... | .60 | .60 | .60 |
| Somerset, Penn. | ..... | 1.85–2.00 | ..... | 1.50–1.75 | ..... | ..... |
| Steilacoom, Wash. | .25 | ..... | ..... | ..... | ..... | ..... |
| St. Louis, Mo. | ..... | ..... | Mine run gravel, 1.55 per ton | ..... | ..... | ..... |
| Summit Grove, Ind. | .50 | .50 | .50 | .50 | .50 | .54 |
| Winona, Minn. | ..... | ..... | ..... | ..... | ..... | .60 |
| York, Penn. | 1.10 | 1.00 | ..... | ..... | ..... | ..... |

*Cubic yd. ‡Delivered on job by truck. (a) ⅝-in. down. (b) 1½- to ¼-in., 1.65. (c) 2½-in. and less. ‖By truck only. (d) Delivered in Hartford, Conn., $1.50 per yd. (e) Mississippi River. (f) Meramee River. (g) Per yd., del. by truck, ¼-in. down, 1.25; 2 in. and less, 2.40. (h) ¼- to ¾-in., 1.25. (j) Lake sand, 1.75, delivered. (k) 60–70% crushed boulders. (m) Cu. yd., dune sand, f.o.b. cars, Chicago. (n) Cu. yd., f.o.b. cars, Chicago. (r) Pit run. (s) Plus 15c for winter loading. (t) Fine and regular binder. (u) Coarse, torpedo, also roofing. (v) Coarse binder. †2% discount if paid by 15th of month following delivery.

## Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

| City or shipping point | Molding, fine | Molding, coarse | Molding brass | Core | Furnace lining | Sand blast | Stone sawing |
|---|---|---|---|---|---|---|---|
| Albany, N. Y. | 2.25 | 2.00 | 2.25 | ..... | ..... | 3.75 | ..... |
| Beach City, Ohio | 1.75 | 1.75 | ..... | 1.50 | 1.50 | ..... | ..... |
| Cheshire, Mass. | Sand for soap, 7.00–8.00 | | | | | | |
| Dresden, Ohio | 1.25–1.50 | 1.25–1.50 | 1.50–1.75 | 1.00–1.25 | ..... | 6.00–8.00 | ..... |
| Eau Claire, Wis. | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Elco, Ill. | Ground silica, 90-99½% thru 325 mesh, 16.00–40.00 per ton | | | | | 2.50–3.00 | ..... |
| Estill Springs and Sewanee, Tenn. | 1.25 | ..... | ..... | 1.25 | ..... | 1.35–1.50 | ..... |
| Franklin, Penn. | 1.75 | 1.75 | ..... | 1.75 | ..... | ..... | ..... |
| Kasota, Minn. | ..... | ..... | ..... | ..... | ..... | ..... | 1.00 |
| Kerrs, Ohio | 1.00–1.50 | 1.25–2.00 | 2.00 | ..... | ..... | 2.75–3.00 | ..... |
| Klondike, Mo. | 2.00 | ..... | ..... | 2.00 | 2.00 | ..... | ..... |
| Masillon, Ohio | 2.25 | 2.25 | ..... | 2.25 | 2.50 | ..... | ..... |
| Michigan City, Ind. | ..... | ..... | ..... | .30– .35 | ..... | ..... | ..... |
| Montoursville, Penn. | ..... | ..... | ..... | 1.50 | ..... | ..... | ..... |
| New Lexington, Ohio | 2.00 | 1.25 | 2.00 | ..... | ..... | ..... | ..... |
| Ohlton, Ohio | 1.75 | 1.75 | ..... | 2.00 | 1.75 | 1.75 | ..... |
| Ottawa, Ill. | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 3.50 | 3.00 |
| Red Wing, Minn. (d) | ..... | ..... | ..... | ..... | 1.50 | 3.00 | 1.50 |
| San Francisco, Calif.[1] | 3.50† | 5.00† | 3.50† | 3.50–5.00† | 3.50–5.00† | 3.50–5.00† | ..... |
| Silica, Mendota, Va. | Potters sand, 8.00–10.00g | | | | | | |
| Utica and Ottawa, Ill. | .40–1.00f | .40–1.00f | .75–1.00 | .40–1.00f | .60–1.00f | 2.23–3.25 | 1.00–3.25 |
| Warwick, Ohio | 1.50*–2.00h | 1.50*–2.00h | ..... | 1.50*–2.00h | ..... | ..... | ..... |
| Zanesville, Ohio | 2.00 | 1.50 | 2.00 | 2.50 | 2.00 | ..... | ..... |

*Green. †Fresh water washed, steam dried. [1]Core, washed and dried, 2.50. (d) Filter sand, 3.00. (e) Filter sand, 3.00–4.25. (f) Crude and dry. (g) Also 12.00; building sand, 1.75–2.00. (h) Washed, 1.75.

## Crushed Slag

| City or shipping point | Roofing | ¼ in. down | ½ in. and less | ¾ in. and less | 1½ in. and less | 2½ in. and less | 3 in. and larger |
|---|---|---|---|---|---|---|---|
| **EASTERN:** | | | | | | | |
| Buffalo, N. Y., Erie and Du Bois, Penn. | 2.25 | 1.25 | 1.25 | 1.35 | 1.25 | 1.25 | 1.25 |
| Eastern Penn. | 2.50 | 1.20 | 1.50 | 1.20 | 1.20 | 1.20 | 1.20 |
| Northern New Jersey | 2.50 | 1.20 | 1.50 | 1.20 | 1.20 | 1.20 | 1.20 |
| Reading, Penn. | 2.00 | 1.00 | ..... | 1.25 | ..... | ..... | ..... |
| Western Pennsylvania | 2.50 | 1.25 | 1.50 | 1.25 | 1.25 | 1.25 | 1.25 |
| **CENTRAL:** | | | | | | | |
| Ironton, Ohio | ..... | 1.30* | ..... | 1.45* | ..... | 1.45* | ..... |
| Jackson, Ohio | ..... | 1.05* | ..... | 1.30* | 1.05* | 1.30* | ..... |
| Toledo, Ohio | 1.50 | 1.10 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| **SOUTHERN:** | | | | | | | |
| Ashland, Ky. | ..... | 1.45* | ..... | 1.45* | 1.45* | 1.45* | ..... |
| Ensley and Alabama City, Ala. | 2.05 | .55 | 1.25 | 1.15 | .90 | .90 | .80 |
| Longdale, Roanoke, Ruesens, Va. | 2.50 | .75 | 1.25 | 1.25 | 1.25 | 1.15 | 1.05 |
| Woodward, Ala.† | 2.05 | .55* | ..... | 1.15* | .90* | .90* | ..... |

*5c per ton discount on terms. †1¼ in. to ¼ in., $1.05*; ⅜ in. to 10 mesh, $1.25*; ⅜ in. to 0 in., .90*; ¼ in. to 10 mesh, .80*.

## Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

| | Finishing hydrate | Masons' hydrate | Agricultural hydrate | Chemical hydrate | Ground burnt lime, Blk. | Ground burnt lime, Bags | Lump lime, Blk. | Lump lime, Bbl. |
|---|---|---|---|---|---|---|---|---|
| **EASTERN:** | | | | | | | | |
| Berkeley, R. I. | ..... | ..... | 12.00 | ..... | ..... | 18.00 | ..... | 2.00 |
| Buffalo, N. Y. | 11.50 | 7.50 | 7.50 | 12.00 | 8.00 | 11.00 | 7.50 | 1.50[16] |
| Lime Ridge, Penn. | ..... | ..... | ..... | ..... | ..... | ..... | 5.00 | ..... |
| West Stockbridge, Mass. | 12.00 | 10.00 | 5.60 | ..... | ..... | ..... | ..... | 2.00[13] |
| Williamsport, Penn. | 10.00–11.00 | 8.50–9.00 | 8.50–9.00 | ..... | 7.00 | 9.00 | 5.00 | ..... |
| York, Penn., & Oranda, Va. | 11.50[7] | 8.50–9.50[7] | 8.50–9.50[7] | 8.50–10.50[7] | 8.00 | 9.25 | 7.00 | 1.40[5] |
| **CENTRAL:** | | | | | | | | |
| Afton, Mich. | ..... | ..... | ..... | ..... | ..... | 10.75 | 7.50 | 12.11 |
| Carey, Ohio | 11.50 | 7.50 | 7.50 | ..... | 8.00 | ..... | 7.50 | 1.50 |
| Cold Springs, Ohio | ..... | 6.50 | 6.50 | ..... | ..... | ..... | ..... | ..... |
| Gibsonburg, Ohio | 9.50 | ..... | ..... | ..... | 8.00 | 10.00 | ..... | ..... |
| Huntington, Ind. | 11.50 | 7.50 | 7.50 | 12.00 | 8.00 | 11.00 | 7.50 | 1.50[16] |
| Luckey, Ohio | 11.50 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Milltown, Ind. | ..... | 8.50–10.00 | ..... | 10.00[8] | ..... | ..... | 8.50[22] | 1.35[16] |
| Ohio points | 11.50 | 7.50 | 7.50 | 12.00 | 8.00 | 11.00[23] | 7.50 | 1.50[16] |
| Scioto, Ohio | 10.50 | 7.50 | 7.50 | 8.50 | 8.00 | .62½ | 7.00 | 1.50 |
| Sheboygan, Wis. | ..... | 10.50 | ..... | ..... | ..... | ..... | 9.50 | 2.00[4] |
| Wisconsin points[6] | ..... | 11.50 | ..... | ..... | ..... | ..... | 9.50 | ..... |
| Woodville, Ohio[26] | 9.50 | 6.50 | 6.50 | 10.50[24] | 8.00 | 10.00[9] | 8.00 | 1.40[3] |
| **SOUTHERN:** | | | | | | | | |
| El Paso, Texas | ..... | ..... | ..... | ..... | ..... | ..... | 7.00 | 1.50 |
| Frederick, Md. | ..... | 8.00–9.50 | 8.00–9.50 | ..... | ..... | 9.50[15] | 7.00[15] | ..... |
| Graystone & Landmark, Ala. | 12.50 | 9.00 | ..... | 12.50 | 8.50 | ..... | 7.50 | 1.35 |
| Keystone, Ala. | 17.00 | 9.00 | 9.00 | 10.00 | ..... | ..... | 7.50 | 1.35 |
| Knoxville, Tenn. | 17.00 | 9.00 | 9.00 | 9.00 | 7.50 | .62½ | 7.50 | 1.35 |
| Ocala and Kendrick, Fla. | ..... | 11.00 | ..... | ..... | ..... | ..... | ..... | .75[21] |
| **WESTERN:** | | | | | | | | |
| Kirtland, N. M. | ..... | ..... | ..... | ..... | ..... | ..... | 10.00 | ..... |
| Los Angeles, Calif. | 15.00 | 14.00 | 12.00 | 18.00 | ..... | ..... | 13.50 | ..... |
| San Francisco, Calif. | 19.50 | 15.00 | 13.00 | 15.00–19.00 | 14.50[20] | .90[17] | 14.50[19] | 1.85[17] |
| Tehachapi, Calif.[18] | 10.80 | ..... | 6.75[11] | 12.00 | ..... | ..... | 10.30 | ..... |
| Seattle, Wash. | 19.00 | 19.00 | 12.00 | 19.00 | 19.00 | ..... | 18.60 | 2.30 |

[1] Barrels. [2] Net ton. [3] Wooden, steel 1.60. [4] Steel; in bbl. .95. [5] Dealers' prices, net 30 days less 25c discount per ton on hydrated lime and 5c per bbl. on lump if paid in 10 days. [7] In paper bags, including bags. [8] To 11.00. [9] 80-lb. [10] In bags. [11] Refuse or air slack, 10.00–12.00. [12] To 3.00. [13] Delivered in Southern California. [14] To 8.00. [16] To 1.70. [17] Less credit for return of empties. [19] 90-lb. sacks. [20] To mortar plant and large industrials, 13.00. [20]Also 13.00. [21] Per ½-bbl. bag. [22] To 9.00. [23] Per bbl., 2.15. [24] Superfine, 99.5% thru 200 mesh. [25] To 16.50. [26] General purpose hydrated lime in 10-lb. paper sacks, 12.50 per ton.

## Miscellaneous Sands

(Continued)

| City or shipping point | Roofing sand | Traction |
|---|---|---|
| Montoursville, Penn. | ..... | 1.25 |
| Ohlton, Ohio | 1.75 | 1.75 |
| Ottawa, Ill. | 3.25 | 1.25 |
| Red Wing, Minn. | ..... | 1.00 |
| San Francisco, Calif. | 3.50 | 3.50 |
| Silica, Va. | ..... | 1.75 |
| Utica and Ottawa, Ill. | 1.00–3.25 | .75 |
| Warwick, Ohio | ..... | 2.00 |
| Zanesville, Ohio | ..... | 2.50 |

## Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

| | |
|---|---|
| **Chatsworth, Ga.:** | |
| Crude talc, per ton | 5.00 |
| Ground talc (20-50 mesh), bags | 7.50 |
| Ground talc (150-200 mesh), bags | 10.00 |
| Pencils and steel crayons, gross | 1.50– 2.50 |
| **Chester, Vt.:** | |
| Ground talc (150-200 mesh), paper bags (bags extra) | 8.00– 8.50 |
| Same, including 50-lb. bags | 9.00– 9.50 |
| **Chicago and Joliet, Ill.:** | |
| Ground (150-200 mesh), bags | 30.00 |
| **Clifton, Va.:** | |
| Crude talc, per ton | 4.00 |
| Ground talc (150-200 mesh), in bags | 12.00 |
| **Conowingo, Md.:** | |
| Crude talc, bulk | 4.00 |
| Ground talc (150-200 mesh), in bags | 14.00 |
| Cubes, blanks, per lb. | .10 |
| **Dalton, Ga.:** | |
| Crude talc (for grinding) | 4.00 |
| Ground talc (150-200 mesh), bags | 9.00 |
| Pencils and steel worker's crayons, per gross | 1.00– 2.00 |
| **Emeryville, N. Y.:** | |
| Ground talc (200 mesh), bags | 13.75 |
| Ground talc (325 mesh), bags | 14.75 |
| **Hailesboro, N. Y.:** | |
| Ground talc (300-350 mesh) in 200-lb. bags | 15.50–20.00 |
| **Henry, Va.:** | |
| Crude (mine run) | 3.50– 4.00 |
| Ground talc (150-200 mesh), bags | 7.75–11.00 |
| **Joliet, Ill.:** | |
| Ground talc (200 mesh) in bags: | |
| California white | 30.00 |
| Southern white | 20.00 |
| Illinois talc | 10.00 |
| Crude talc | 3.75 |
| **Keeler, Calif.:** | |
| Ground (200-300 mesh), bags | 20.00–30.00 |
| **Los Angeles, Calif.:** | |
| Ground talc (150-200 mesh) in bags | 15.00–24.00 |
| **Natural Bridge, N. Y.:** | |
| Ground talc (300-325 mesh), bags | 12.00–15.00 |

(a) Bags extra.

## Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

| | |
|---|---|
| **Lump Rock** | |
| Columbia, Tenn.—B.P.L. 65-70% | 3.50– 4.50 |
| Gordonsburg, Tenn.—B.P.L. 65-70% | 3.75– 4.00 |
| Mt. Pleasant, Tenn.—B.P.L., 75% | 6.50 |
| Tennessee — F.o.b. mines, gross ton, unground brown rock, B.P.L. 72% | 5.00 |
| B.P.L. 75% | 6.00 |
| Twomey, Tenn.—B.P.L. 65%, 2000 lb. | 8.00– 9.00 |
| **Ground Rock (2000 lb.)** | |
| Centerville, Tenn.—B.P.L. 65% | 8.00 |
| Gordonsburg, Tenn.—B.P.L. 65–70% | 3.75– 4.50 |
| Mt. Pleasant, Tenn.—Lime phosphate: | |
| B.P.L., 73%, 80% thru 300 mesh | 11.80 |
| B.P.L. 72% | 5.00 |
| Twomey, Tenn.—B.P.L. 65% | 8.00 |
| Wales, Tenn.—B.P.L. 65% | 11.00 |

## Florida Phosphate

**(Raw Land Pebble)**

(Per Ton)

| | |
|---|---|
| Florida—F.o.b. mines, gross ton, 68/66% | |
| B.P.L., Basis 68% | 3.25 |
| 70% min. B.P.L., Basis 70% | 3.75 |

## Mica

Prices given are net, f.o.b. plant or nearest shipping point.

| | |
|---|---|
| Bedford, N. Y.—Mine scrap | 12.50–14.70 |
| New York City, N. Y.—Per lb., | |
| Cut mica (1½x2) | 1.60 |
| Cut mica (8x10) | 26.00 |
| Pringle, S. D.—Mine run, per ton | 125.00 |
| Punch mica, per lb. | .06 |
| Scrap, per ton, carloads | 20.00 |
| Rumney Depot, N. H.—Per ton, | |
| Mine run | 300.00 |
| Clean shop scrap | 27.00 |
| Mine scrap | 20.00 |
| Roofing mica | 38.00 |
| Punch mica, per lb. | .05– .12 |
| Trimmed mica; 50% disc. from list, per ton, 20 mesh, 32.50; 40 mesh, 38.00; 60 mesh, 40.00; 100 mesh, 60.00; 200 mesh | 70.00 |
| Trenton, N. J.—Mine scrap, per ton | 20.00 |
| Clean shop scrap, per ton | 22.00 |

## Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

| City or shipping point | Terrazzo | Stucco-chips |
|---|---|---|
| Brandon, Vt.—English pink, cream, and American Botticino, coral pink, pearl blush | ‖12.50–‖14.50 | ¶12.50–‖14.50 |
| Brighton, Tenn.—Pink marble chips | $3.00 | $3.00 |
| Crown Point, N. Y.—Mica Spar | ¶9.00–‖12.00 | |
| Davenport, Ia.—White limestone, in ba | 6.00 | 6.00 |
| Easton, Penn.—Royal green | 16.00–20.00a | |
| Harrisonburg, Va. — Bulk marble (crushed, in bags) | 12.50–14.00 | 12.50–14.00 |
| Ingomar, Ohio — Concrete facings and stucco dash | | 11.00–18.00 |
| Middlebrook, Mo.—Red | | 20.00–25.00 |
| Middlebury, Vt. — Middlebury white | ‖9.00–¶10.00 | |
| Middlebury and Brandon, Vt.—Caststone, per ton, including bags | | 5.50 |
| Phillipsburg, N. J.—Royal green granite | | 18.00–20.00 |
| Randville, Mich.—Crystalite white marble, bulk | 4.00 | 4.00– 7.00 |
| Stockton, Calif.—"Nat-rock" roofing grits | | 12.00–20.00 |
| Tuckahoe, N. Y.—Tuckahoe white | 8.00 | |
| Warren, N. H. | | 7.90– 8.40 |
| Wellsville, Colo.—Colorado Travertine Stone | 15.00 | 15.00 |
| Whitestone, Ga. | b5.00 | |

†C.L.; L.C.L. 16.00. ¶C.L. ‖L.C.L. (a) Including bags. (b) In burlap bags, 2.00 per ton extra. *Per 100 lb.

## Soda Feldspar

DeKalb Jct., N. Y.—Color, white; pulverized, 100% thru 200 mesh, in bags, per ton, 22.00, bulk 20.00; 100% thru 140 mesh, in bags, per ton, 20.00; bulk ..... 18.00

## Potash Feldspar

**Auburn and Topsham, Me.—Color white, 98% thru 140-mesh** ..... 19.00

Bedford Hills, N. Y.—Color, white; analysis, $K_2O$, 12.26%; $Na_2O$, 2.86%; $SiO_2$, 66.05%; $Fe_2O_3$, .08%; $Al_2O_3$, 18.89%; pulverized 78% thru 100 mesh, bulk, 11.00–14.00; crude, bulk, per ton ..... 9.00

Trenton, N. J.—White; analysis, $K_2O$, 13-14%; $Na_2O$, 2-2½%; $SiO_2$, 64-65%; $Fe_2O_3$, 0.07%; $Al_2O_3$, 18.50-19.25%; pulverized, 97% thru 325 mesh, crude, 8.50 per ton, ground ..... 21.00

Rochester, N. Y. ..... 22.00

**Los Angeles, Calif.—Color, white; analysis, $K_2O$, 12.16%; $Na_2O$, 1.53%; $SiO_2$, 65.60%; $Fe_2O_3$, .10%; $Al_2O_3$, 19.20%; Arizona spar, crude, bags, 12.50–14.00; bulk** ..... 11.00–12.50

**Pulverized, 95% thru 200 mesh; bags, 19.73–23.50; bulk** ..... 15.75–22.50

**Pulverized, 20% thru 80 mesh; bags, 17.60; bulk** ..... 16.50

Rumney and Cardigan, N. H.—Color, white; analysis, $K_2O$, 9-12%; $Na_2O$, trace; $SiO_2$, 64-67%; $Al_2O_3$, 17-18%, crude, bulk ..... 7.00– 7.50

Rumney Depot, N. H.—Color, white; analysis, $K_2O$, 8-13%; $Na_2O$, 1-1½%; $SiO_2$, 62-68%; $Al_2O_3$, 17-18%, crude, bulk ..... 7.00– 7.50

**Penland, N. C.—White; crude, bulk** ..... **8.00**

**Ground, bulk** ..... **16.50**

**Spruce Pine, N. C.—Color, white; analysis, $K_2O$, 10%; $Na_2O$, 3%; $SiO_2$, 68%; $Fe_2O_3$, 0.10%; $Al_2O_3$, 18%;** 99½% thru 200 mesh; pulverized, bulk ..... 18.00

(Bags 15c extra.)

**Tennessee Mills—Color, white; analysis, $K_2O$, 10%; $Na_2O_3$, 3%; $SiO_2$, 68%; 99½% thru 200 mesh; bulk (Bags, 15c extra)** ..... 18.00

## Chicken Grits

| | |
|---|---|
| Afton, Mich.—(Limestone), per ton | 1.75 |
| Belfast, Me.—(Limestone), per ton | ‡10.00 |
| Centerville, Iowa | 9.25 |
| Chico, Tex.—Hen size and Baby Chick, packed in 100-lb. sacks, per ton | 10.00 |
| Danbury, Conn.; Adams, Ashley Falls, and West Stockbridge, Mass.—(Limestone) | ‡7.50–*9.00 |
| Davenport, Ia.—(Limestone), bags, per ton | 6.00 |
| Easton, Penn.—In bags | 8.00 |
| El Paso, Tex.—Per ton | 1.00 |
| Knoxville, Tenn.—Per bag | 1.25 |
| Los Angeles, Calif.—Per ton, including sacks: | |
| Feldspar | 14.00 |
| Gypsum | 7.50– 9.50 |
| Marion, Va.—(Limestone), bulk, 5.00; bagged, 6.50; 100-lb. bag | .50 |
| Middlebury, Vt.—Per ton (a) | 10.00 |
| Piqua, O. (b)—(Pearl Grit), fine and medium, per ton | ¶8.00 |
| Randville, Mich.—(Marble), bulk | 6.00 |
| Rocky Point, Va.—(Limestone), 100-lb. bags, 50c; sacks, per ton, 6.00; bulk | 5.00 |
| Seattle, Wash.—(Gypsum), bulk, per ton | 10.00 |
| Tuckahoe, N. Y. | 8.00 |
| Waukesha, Wis.—(Limestone), per ton | 8.00 |
| West Stockbridge, Mass. | 7.50– 9.00 |
| Wisconsin Points—(Limestone), per ton | 15.00 |
| Winona, Minn.—(Limestone), sacked, per ton, 8.00; bulk, per ton | 6.00 |

*L.C.L. †Less than 5-ton lots. ‡C.L. ¶100-lb. bags.

(a) F.o.b. Middlebury, Vt. (b) F.o.b. Piqua, Ohio.

## Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

| | |
|---|---|
| Albany, Ga. | 11.00 |
| Barton, Wis. | 10.50 |
| Boston, Mass. | 17.00* |
| Brighton, N. Y. | 19.75* |
| Dayton, Ohio | 12.50–13.50 |
| Detroit, Mich. (h) | j13.00–16.00*d |
| Farmington, Conn. | 16.00 |
| Flint, Mich. | 18.00† |
| Grand Rapids, Mich. | 12.50 |
| Hartford, Conn. | 13.00–17.00* |
| Jackson, Mich. | 13.00 |
| Lakeland, Fla. | 10.00–11.00 |
| Lake Helen, Fla. | 9.00–12.00 |
| Lancaster, N. Y. | 12.50 |
| Madison, Wis. | 12.00–12.50a |
| Mishawaka, Ind. | 11.00 |
| Milwaukee, Wis. | 13.00* |
| Minneapolis, Minn. | 10.00 |
| New Brighton, Minn. | 10.00 |
| Pontiac, Mich. | 15.50 |
| Portage, Wis. | 15.00 |
| Prairie du Chien, Wis. | 18.00–22.50 |
| Rochester, N. Y. | 19.75 |
| Saginaw, Mich. | 13.50 |
| San Antonio, Texas | 12.50 |
| Sebewaing, Mich. | 12.50 |
| Sioux Falls, S. Dak. | 13.00 |
| South River, N. J. | 13.00 |
| South St. Paul, Minn. | 9.00 |
| Syracuse, N. Y. | 18.00–20.00 |
| Toronto, Canada | 11.50 |
| Wilkinson, Fla. | 12.00–16.00 |
| Winnipeg, Canada | 15.00 |

*Delivered on job. ‖Dealers' price. (a) Less 50c disc. per M, 10th of month. (d) 5% disc., 10th of month. (f) In yard, 12.00, 12.25 and 12.50. (h) Also 15.50.* (j) Also 14.00.

## Portland Cement

| | Per Bag | Per Bbl. | High Early Strength |
|---|---|---|---|
| Albuquerque, N. M. | .86¼ | 3.45 | ..... |
| Atlanta, Ga. | ..... | 2.26 | 3.16¶ |
| Baltimore, Md. | ..... | 2.25 | 3.55¶ |
| Birmingham, Ala. | ..... | 1.90 | 2.80¶ |
| Boston, Mass. (g) | .44½ | 1.78–1.88 | 3.27¶ |
| Buffalo, N. Y. | .48¾ | 1.95–2.45 | 3.35¶ |
| Butte, Mont. | .90¼ | 3.61 | ..... |
| Cedar Rapids, Iowa | ..... | 2.24 | ..... |
| Charleston, S. C. | ..... | 2.25–2.55d | 3.15¶ |
| Cheyenne, Wyo. | .66½ | 2.66 | ..... |
| Chicago, Ill. | ..... | 2.05–2.45 | 3.35¶ |
| Cincinnati, Ohio | ..... | 2.17–2.57 | 3.47¶ |
| Cleveland, Ohio | ..... | 1.94–2.64 | 3.34¶ |
| Columbus, Ohio | ..... | 2.22–2.62 | 3.52¶ |
| Dallas, Texas | ..... | 1.80 | 3.39¶ |
| Davenport, Iowa | ..... | 2.24 | ..... |
| Dayton, Ohio | ..... | 2.21–2.61 | 3.51¶ |
| Denver, Colo. | ..... | 2.55 | ..... |
| Des Moines, Iowa | ..... | 2.14 | ..... |
| Detroit, Mich. | ..... | 1.95–2.35 | 3.25¶ |
| Duluth, Minn. | ..... | 2.04 | ..... |
| Houston, Texas | ..... | 1.90 | 3.63¶ |
| Indianapolis, Ind. | .54¾ | 2.09–2.49 | 3.39¶ |
| Jackson, Miss. | ..... | 1.94–2.34 | 3.24¶ |
| Jacksonville, Fla. | ..... | 2.51b | 3.26¶ |
| Jersey City, N. J. | ..... | 2.13–2.53 | 3.43¶ |
| Kansas City, Mo. | .45½ | 1.82 | 3.22¶ |
| Los Angeles, Calif. | .51½ | 2.06 | ..... |
| Louisville, Ky. | .55½ | 2.47 | 3.37¶ |
| Memphis, Tenn. | ..... | 1.94–2.34 | 3.24¶ |
| Milwaukee, Wis. | ..... | 2.20–2.60 | 3.50¶ |
| Minneapolis, Minn. | ..... | 2.12–2.22 | ..... |
| Montreal, Que. | ..... | 1.60 | ..... |
| New Orleans, La. | .45½ | 1.82 | 3.22¶ |
| New York, N. Y. | .48¼ | 1.93 | 3.33¶ |
| Norfolk, Va. | ..... | 1.97 | 3.27¶ |
| Oklahoma City, Okla. | .57¼ | 2.29 | 3.69¶ |
| Omaha, Neb. | .54 | 2.16 | 3.56¶ |
| Peoria, Ill. | ..... | 2.22 | ..... |
| Pittsburgh, Penn. | ..... | 2.05–2.45 | 3.35¶ |
| Philadelphia, Penn. | ..... | 2.15 | 3.45¶ |
| Phoenix, Ariz. | ..... | 3.91* | ..... |
| Portland, Ore.‡ | ..... | 2.40–2.50a | ..... |
| Reno, Nev.‡ | ..... | 2.91–3.41a | ..... |
| Richmond, Va. | ..... | 2.32 | 3.62¶ |
| Salt Lake City, Utah | .70¼ | 2.81 | ..... |
| San Francisco, Calif.‡ | ..... | 2.21–2.71a | ..... |
| Savannah, Ga. | ..... | 2.51c | 3.15¶ |
| St. Louis, Mo. | .48¾ | 1.95–2.35 | f3.25¶ |
| St. Paul, Minn. | ..... | 2.12–2.22 | ..... |
| Seattle, Wash. | ..... | †2.50–2.65j | f3.50† |
| Tampa, Fla. | ..... | 2.40 | 3.30¶ |
| Toledo, Ohio | ..... | 2.20–2.60 | 3.50¶ |
| Topeka, Kan. | .50¼ | 2.01 | 3.41¶ |
| Tulsa, Okla. | .53¼ | 2.13 | 3.53¶ |
| Wheeling, W. Va. | ..... | 2.12–2.52 | 3.42¶ |
| Winston-Salem, N. C. | ..... | 2.19 | 3.49¶ |
| Mill prices f.o.b. in carload lots, without bags, to contractors. | | | |
| Albany, N. Y. | ..... | 2.15 | ..... |
| Bellingham, Wash. | ..... | 2.10 | ..... |
| Buffington, Ind. | ..... | 1.80 | ..... |
| Chattanooga, Tenn. | ..... | 2.45* | ..... |
| Concrete, Wash. | ..... | 2.35 | ..... |
| Davenport, Calif. | ..... | 2.05 | ..... |
| Hannibal, Mo. | ..... | 1.90 | ..... |
| Hudson, N. Y. | ..... | 1.75 | ..... |
| Leeds, Ala. | ..... | 1.65 | ..... |
| Lime and Oswego, Ore. | ..... | 2.50‡ | ..... |
| Mildred, Kan. | ..... | 2.35 | ..... |
| Nazareth, Penn. | ..... | 2.15 | ..... |
| Northampton, Penn. | ..... | 1.75 | ..... |
| Richard City, Tenn. | ..... | 2.05 | ..... |
| Steelton, Minn. | ..... | 1.85 | ..... |
| Toledo, Ohio | ..... | 2.20 | ..... |
| Universal, Penn. | ..... | 1.80 | ..... |

NOTE—Add 40c per bbl. for bags. *Includes sacks. †10c disc., 10 days. ‡10c disc., 15 days. (a) Includes cloth sacks returnable at 10c each. (b) 15c bbl. refund for paid freight bill. (c) 26c bbl. refund for paid freight bill. (d) 30c bbl. refund for paid freight bill. (e) Paid freight bill taken as part payment of invoice. (f) "Velo" cement, including cost of paper bag, 10c disc. 10 days. ¶"Incor" Perfected, prices per bbl. packed in paper sacks, subject to 10c disc. 15 days. (g) Also 2.33 per bbl. (j) 25c bbl. disc. 10 days.

## Gypsum Products— CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

| | Crushed Rock | Ground Gypsum | Agricultural Gypsum | Stucco Calcined Gypsum | Cement and Gaging Plaster | Wood Fiber | Gaging White | Plaster Sanded | Cement Keene's | Finish Trowel | —Plaster Board— ½x32x 36". Per M Sq. Ft. | ½x32x 36". Per M Sq. Ft. | Wallboard, ⅜x32 or 48" Lengths 6'-10'. Per M Sq. Ft. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acme, Tex. | 1.50–3.00 | 4.00 | 4.00 | 4.00–6.00 | 4.00–6.00 | 4.00–6.00 | 10.00 | 10.00 | 19.00 | 19.00 | 10.50 | 10.50 | 12.00 |
| Blue Rapids, Kan. | 1.50–3.00 | 4.00 | 4.00 | 4.00–6.00 | 4.00–6.00 | 4.00–6.00 | 10.00 | 10.00 | 19.00 | 19.00 | 10.50 | 10.50 | 12.00 |
| Centerville, Iowa | ..... | ..... | 6.00 | 7.00 | ..... | 7.50 | 8.50 | 10.50e | ..... | ..... | ..... | ..... | ..... |
| Delawanna, N. J. | ..... | ..... | ..... | 4.50–5.00 | 13.10–14.00 | 5.00 | ..... | 7.25 | ..... | ..... | ..... | ..... | 25.00 |
| East St. Louis, Ill. | Special Gypsum Products—Interior partition section, 4 in. wide, 12 in. thick and up to 10 ft. 6 in. long, per ton, 21.00; 6x6 in. and up to 10 ft. 6 in. long, per ton, 30.00; floor section, 7x16 in. and up to 13 ft. 6 in. long, per ton, 23.00. | | | | | | | | | | | | |
| Ft. Dodge, Iowa; N. Holston, Va.; Akron, N. Y. | 1.50–3.00 | 4.00 | 4.00 | 4.00–6.00 | 4.00–6.00 | 4.00–6.00 | 10.00 | 10.00 | 19.00 | 19.00 | 10.50 | 10.50 | 12.00 |
| Grand Rapids, Mich. | 1.50–3.00 | 4.00 | 4.00 | 4.00–6.00 | 4.00–6.00 | 4.00–6.00 | 10.00 | 10.00 | 19.00 | 19.00 | 10.50 | 10.50 | 12.00 |
| Gypsum, Ohio | 1.70–3.00 | 4.00 | 6.00 | 7.00–9.00 | 9.00 | 9.00 | 19.00 | 7.00 | 24.50 | 19.00 | ..... | 15.00 | 20.00–25.00 |
| Los Angeles, Calif. (f) | 5.00 | ..... | 7.50–9.50 | 12.20 | ..... | ..... | 12.20–14.10 | 13.10 | 29.00–40.00 | 11.20–13.10 | ..... | ..... | 33.75–41.25 |
| Medicine Lodge, Kan. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 15.00y | ..... | ..... | ..... | ..... |
| Oakfield, N. Y. | 2.50 | ..... | ..... | 5.50 | 6.00 | 6.00 | ..... | 5.50 | ..... | ..... | ..... | 15.00 | 25.00 |
| Providence, R. I. (x) | ..... | ..... | ..... | 12.00–13.00o | ..... | ..... | ..... | ..... | ..... | ..... | Partition block, solid reinforced, 12x30x3", 7c per sq. ft. in truck lots | | |
| Seattle, Wash. (z) | 6.00 | 9.00 | 9.00 | 13.00 | ..... | ..... | 14.00 | ..... | ..... | ..... | ..... | ..... | ..... |
| Winnipeg, Man. | 5.00 | 5.00 | 7.00 | 13.00 | 14.00 | 14.00 | ..... | ..... | ..... | ..... | 20.00w | 25.00 | 33.00 |

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable. (a) Hardwall plaster, 13.00; casting, finishing molding, 14.00; (b) Calacoustic plaster, 10.00 at mill; (c) Plaster lath; (d) ¼x48x36 in.; (e) white molding; (f) plasterboard, 18c to 20c per yd.; (m) includes paper bags; (o) includes jute sacks; (u) includes sacks; (v) retail, 35.00; (w) 16x48; (x) 2- and 3-in. "Fabricaste" gypsum blocks, 8½c sq. ft., f.o.b. job. (y) jute sacks, 18.00; paper sacks, 16.00. (z) Gypsum partition tile, 3-in., 9c per sq. ft.; 4-in., 11c per sq. ft.

# Market Prices of Cement Products and Slate

## Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point.

| City or shipping point | Size 8x8x16 |
|---|---|
| Camden, N. J. | 16.50 |
| Cement City, Mich. | 55.00¶ |
| Chicago District‖ | 180.00–210.00a |
| 8x10x16 | 230.00–260.00a |
| 8x12x16 | 280.00–330.00a |
| Columbus, Ohio | 15.00c– 17.00† |
| Detroit, Mich. (d) | .15– .17† |
| Forest Park, Ill. | 21.00* |
| Grand Rapids, Mich. | 11.00* |
| Graettinger, Iowa | .18– .20 |
| Indianapolis, Ind. | .10– .12a |
| Los Angeles, Calif. | 4x8x12–5.00* |
| Olivia and Mankato, Minn. | 9.50b |
| Somerset, Penn. | .18– .20 |
| Tiskilwa, Ill. | .16– .18† |
| Yakima, Wash. | 20.00* |

*Price per 100 at plant. †Rock or panel face. ‡Delivered. ¶5x8x12, 55.00 per 1000. (a) Face. (b) Per ton. (c) Plain. (d) 8x12x16, rock or panel face, .24–.26.

## Cement Building Tile

| | |
|---|---|
| Camden and Trenton, N. J.: | |
| 3x8x16, per 100, 9.00; 3x9x16, per 100 | 9.00 |
| 4x8x16, per 100, 12.00; 4x9x16, per 100 | 13.00 |
| 6x8x16, per 100, 16.50; 6x9x16, per 100 | 15.50 |
| Cement City, Mich.: | |
| 5x8x12, per 100 | 5.00 |
| Chicago District (Haydite): | |
| 4x 8x16, per 100 | 13.00 |
| 8x 8x16, per 100 | 20.00 |
| 8x12x16, per 100 | 28.00 |
| Columbus, Ohio: | |
| 5x8x12, per 100 | 6.00 |
| Detroit, Mich.: | |
| 5½x8x12, per M | 75.00 |
| Grand Rapids, Mich.: | |
| 5x8x12, per 100 | 6.00 |
| Longview, Wash.: | |
| 4x6x12, per 100 | 5.00 |
| 4x8x12, per 100 | 6.25 |
| Mt. Pleasant, N. Y.: | |
| 5x8x12, per M | 78.00 |
| Houston, Texas: | |
| 5x8x12 (Lightweight), per M | 80.00 |

## Cement Roofing Tile

Prices are net per square, carload lots, f.o.b. nearest shipping point, unless otherwise stated.

| | |
|---|---|
| Camden and Trenton, N. J.—8x12, per sq.: | |
| Red | 15.00 |
| Green | 18.00 |
| Cicero, Ill.—French and Spanish tile (red, orange, choc., yellow, tan, slate, gray) per sq., 9.50–10.00; green or blue, per sq. | 11.50–12.00 |
| Detroit, Mich.—5x8x12, per M | 67.50 |
| Houston, Texas—Roofing Tile, per sq. | 25.0c |
| Indianapolis, Ind.—9x15-in. | Per sq. |
| Gray | 10.00 |
| Red | 11.00 |
| Green | 13.00 |
| Wildasin Spur, Los Angeles, Calif. (Stone-Tile): | |
| 3½x6x12, per M | 50.00 |
| 3½x8x12, per M | 60.00 |
| Prairie du Chien, Wis.: | |
| 5x8x12, per M | 82.00 |
| 5x4x12, per M | 46.00 |
| 5x8x6 (half-tile), per M | 41.00 |
| 5x8x10 (fractional), per M | 82.00 |
| Yakima, Wash. (Building Tile): | Each |
| 5x8x12 | .10 |

## Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

| | Common | Face |
|---|---|---|
| Appleton, Minn. | 22.00 | 25.00– 40.00 |
| Baltimore, Md. (Del. according to quantity) | 15.50 | 22.00– 50.00 |
| Camden & Trenton, N. J. | 17.00 | ..... |
| Chicago District "Haydite" | 14.00 | ..... |
| Columbus, Ohio | 16.00 | 17.00 |
| El Paso, Tex.—Klinker | 10.00 | ..... |
| Ensley, Ala. ("Slagtex") | 14.00 | ..... |
| Eugene, Ore. | 25.00 | 35.00– 75.00 |
| Forest Park, Ill. | ..... | 37.00 |
| Friesland, Wis. | 22.00 | 32.00 |
| Longview, Wash.* | 15.00 | 22.50– 65.00 |
| Los Angeles, Calif. | 12.50 | ..... |
| Milwaukee, Wis. | 14.00 | 32.00 |
| Mt. Pleasant, N. Y. | ..... | 14.00– 23.00 |
| Omaha, Neb. | 18.00 | 30.00– 40.00 |
| Pasadena, Calif. | 10.00 | ..... |
| Philadelphia, Penn. | 15.50 | ..... |
| Portland, Ore. | 17.50 | 23.00– 55.00 |
| Mantel brick—100.00–150.00 | | |
| Prairie du Chien, Wis. | 14.00 | 22.50 |
| Rapid City, S. D. | 18.00 | 30.00– 40.00 |
| Waco, Texas | 16.50 | 32.50–125.00 |
| Watertown, N. Y. | 20.00 | 35.00 |
| Westmoreland Wharves, Penn. | 14.75 | 20.00 |
| Winnipeg, Man. | 14.00 | 22.00 |
| Yakima, Wash. | 22.50 | ..... |

*40% off List.

## Stone-Tile Hollow Brick

Prices are net per thousand f.o.b. plant.

| | No. 4 | No. 6 | No. 8 |
|---|---|---|---|
| Albany, N. Y.*† | 40.00 | 60.00 | 70.00 |
| Asheville, N. C. | 35.00 | 50.00 | 60.00 |
| Atlanta, Ga. | 26.50 | 45.00 | 53.00 |
| Brownsville, Tex. | ..... | 53.00 | 62.50 |
| Brunswick, Me.† | 40.00 | 60.00 | 80.00 |
| Charlotte, N. C. | 35.00 | 45.00 | 60.00 |
| De Land, Fla. | 30.00 | 50.00 | 60.00 |
| Farmingdale, N. Y. | 37.50 | 50.00 | 60.00 |
| Houston, Tex. | 35.00 | 45.00 | 60.00 |
| Jackson, Miss. | 45.00 | 55.00 | 65.00 |
| Klamath Falls, Ore. | 65.00 | 75.00 | 85.00 |
| Longview, Wash. | ..... | 55.00 | 64.00 |
| Los Angeles, Calif. | 29.00 | 39.00 | 45.00 |
| Mattituck, N. Y. | 45.00 | 55.00 | 65.00 |
| Medford, Ore. | 50.00 | 55.00 | 70.00 |
| Memphis, Tenn. | 50.00 | 55.00 | 65.00 |
| Mineola, N. Y. | 45.00 | 50.00 | 60.00 |
| Nashville, Tenn. | 30.00 | 49.00 | 57.00 |
| New Orleans, La. | 35.00 | 45.00 | 60.00 |
| Norfolk, Va. | 35.00 | 50.00 | 65.00 |
| Passaic, N. J. | 35.00 | 50.00 | 65.00 |
| Patchogue, N. Y. | ..... | 60.00 | 70.00 |
| Pawtucket, R. I. | 35.00 | 55.00 | 75.00 |
| Safford, Ariz. | 32.50 | 48.75 | 65.00 |
| Salem, Mass. | 40.00 | 60.00 | 75.00 |
| San Antonio, Tex. | 37.00 | 46.00 | 60.00 |
| San Diego, Calif. | 35.00 | 44.00 | 52.50 |

Prices are for standard sizes—No. 4, size 3½x4x12 in.; No. 6, size 3½x6x12 in.; No. 8, size 3½x8x12 in. *Delivered on job. †10% disc.

# Wholesale Prices of Slate

Prices given are f.o.b. at producing point or nearest shipping point

## Slate Flour

Pen Argyl, Penn.—Screened, 200 mesh (94-96% thru 300 mesh), $7.00 per ton in paper bags.

## Slate Granules

Esmont, Va.—Blue, $7.50 per ton.
Pen Argyl, Penn.—Blue-black, 6.00 per ton.
Granville, N. Y.—Red, green and black, $7.50 per ton.

## Roofing Slate

Prices per square—Standard thickness.

| City or shipping point: | 3/16-in. | ¼-in. | ⅜-in. | ½-in. | ¾-in. | 1-in. |
|---|---|---|---|---|---|---|
| Buckingham, Oxford, gray | 13.88 | 19.44 | 24.99 | 29.44 | 34.44 | 45.55 |
| Bangor, Penn.—No. 1 clear | 10.50–14.50 | 24.50 | 29.00 | 33.50 | 44.50 | 55.60 |
| No. 1 ribbon | 9.00–10.25 | 20.00 | 24.50 | 29.00 | 40.00 | 51.25 |
| Gen. mediums | 9.50–11.25 | ..... | ..... | ..... | ..... | ..... |
| No. 2 ribbon | 6.75– 7.25 | ..... | ..... | ..... | ..... | ..... |
| No. 1 Albion clear | 7.25–10.50 | 16.00 | 23.00 | 27.00 | 37.00 | 46.00 |
| Albion mediums | 8.00– 9.00 | ..... | ..... | ..... | ..... | ..... |
| Chapman Quarries, Penn.—No. 1 | 8.50–11.25 | (Vari-tone, 12.00–13.00) | | | | |
| Medium | 7.75– 9.00 | ..... | ..... | ..... | ..... | ..... |
| Hard vein | ..... | 16.00 | 23.00 | 26.00 | 32.00 | 40.00 |
| Granville, N. Y.—Sea green, weathering | 14.00 | 24.00 | 30.00 | 36.00 | 48.00 | 60.00 |
| Semi-weathering, green and gray | 15.40 | 24.00 | 30.00 | 36.00 | 48.00 | 60.00 |
| Mottled purple and unfading green | 21.00 | 24.00 | 30.00 | 36.00 | 48.00 | 60.00 |
| Red | 27.50 | 33.50 | 40.00 | 47.50 | 62.50 | 77.50 |
| Monson, Maine | 19.80 | 24.00 | ..... | ..... | ..... | ..... |
| Pen Argyl, Penn.* | | | | | | |
| Graduated slate (blue) | ..... | 16.00 | 23.00 | 27.00 | 37.00 | 46.00 |
| Graduated slate (grey) | ..... | 18.00 | 25.00 | 29.00 | 39.00 | 48.00 |
| Color-tone | 11.50–12.50; Vari-tone, 12.00–13.00; Cathedral gray, 14.00–15.00 | | | | | |
| No. 1 clear (smooth text) | 7.25–10.50; No. 1 clear (rough text), 8.25–9.50 | | | | | |
| Albion-Bangor medium | 8.00–9.00; No. 2 clear, 8.00–9.00; No. 1 ribbon, 8.00–8.50 | | | | | |
| Slatedale and Slatington, Penn.— | | | | | | |
| Genuine Franklin | 11.25 | 22.00 | 26.00 | 30.00 | 40.00 | 50.00 |
| Blue Mountain No. 1 | 10.50 | 22.00 | 26.00 | 30.00 | 40.00 | 50.00 |
| Blue Mountain No. 1 clear | 9.50 | 18.00 | 22.00 | 26.00 | 36.00 | 46.00 |
| Blue Mountain No. 2 clear | 8.00 | 18.00 | 22.00 | 26.00 | 36.00 | 46.00 |

(a) Prices are for standard preferred sizes (standard 3/16-in. slates), smaller sizes sell for lower prices.
(b) Prices other than 3/16-in. thickness include nail holes.
(c) Prices for punching nail holes, in standard thickness slates, vary from 50c to $1.25 per square.
*Unfading grey, 10.50–12.50; textural, 12.00–15.00; 10% disc. to roofer; 10%–8⅓% to wholesaler.

## Cement Drain Tile

| | |
|---|---|
| Graettinger, Iowa.—Drain tile, per foot: 5-in., .04½; 6-in., .05½; 8-in., .09; 10-in., .12½; 12-in., .17½; 15-in., .35; 18-in., .50; 20-in., .60; 24-in., 1.00; 30-in., 1.35; 36-in. | 2.00 |
| Longview, Wash.—Drain tile, per foot: 3-in., .05; 4-in., .06; 6-in., .10; 8-in., .15; 10-in. | .20 |
| Olivia and Mankato, Minn.—Cement drain tile, per ton | 8.00 |
| Tacoma, Wash.—Drain tile, per 100 ft. | |
| 3-in. | 4.00 |
| 4-in. | 5.00 |
| 6-in. | 7.50 |
| 8-in. | 10.00 |
| Waukesha, Wis.—Drain tile, per ton | 8.00 |

## Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted

| Culvert and Sewer | 4 in. | 6 in. | 8-in. | 10 in. | 12 in. | 15-in. | 18 in. | 20 in. | 22 in. | 24 in. | 27 in. | 30 in. | 36 in. | 42 in. | 48 in. | 54 in. | 60 in. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detroit, Mich. (c) | | | | | | | | | | | | | | | | | |
| Sewer | .10 | .12 | .22 | .30 | .40 | .60 | .90 | 1.20 | ..... | 1.75 | 2.00 | 2.50 | 3.30 | 4.50 | 5.75 | 6.50 | 8.00 |
| Culvert | ..... | ..... | ..... | ..... | .95 | 1.25 | 1.60 | ..... | ..... | 2.25 | 2.50 | 3.00 | 3.50 | 5.00 | 6.50 | 8.00 | 10.00 |
| Grand Rapids, Mich. (b) | ..... | ..... | ..... | .60 | .70 | .90 | 1.20 | ..... | ..... | 1.80 | 2.10 | 2.35 | 3.50 | 4.00 | 5.60 | 6.90 | 7.85 |
| Houston, Texas | ..... | .19 | .28 | .43 | .55½ | .90 | 1.30 | ..... | 1.70† | 2.20 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Indianapolis, Ind. (a) | ..... | ..... | ..... | .75 | .85 | .90 | 1.15 | ..... | ..... | 1.60 | ..... | 2.50 | ..... | ..... | ..... | ..... | ..... |
| Mankato, Minn. (b) | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1.50 | 1.75 | 2.50 | 3.25 | 4.25 | ..... | ..... | ..... |
| Newark, N. J. | 6 in. to 24 in., 18.00 per ton | | | | | | | | | | | | | | | | |
| Norfolk, Neb. (b) | ..... | ..... | ..... | .90 | 1.00 | 1.13 | 1.42 | ..... | ..... | 2.11 | ..... | 2.75 | 3.58 | ..... | 6.14 | ..... | 7.78 |
| Paullina, Iowa‡ | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 2.25 | ..... | 2.11 | ..... | 2.75 | 3.58 | ..... | 6.14 | ..... | 7.78 |
| Somerset, Penn. | ..... | ..... | ..... | ..... | 1.08 | 1.25 | 1.65 | ..... | ..... | 2.50 | ..... | 3.65 | 4.85 | 7.50 | 8.50 | ..... | ..... |
| Tiskilwa, Ill. (rein.) | ..... | ..... | ..... | .75 | .85 | .95 | 1.20 | 1.60 | ..... | 2.00 | ..... | 2.75 | 3.40 | ..... | 6.50 | ..... | 10.00 |
| Tacoma, Wash. | .15 | .18 | .22½ | .30 | .40 | .55 | .85 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Wahoo, Neb. (b) | ..... | ..... | ..... | ..... | .85½ | ..... | 114 | ..... | ..... | 1.81 | ..... | 2.47 | 3.42 | 4.13 | 5.63 | 6.49 | 7.31 |
| Yakima, Wash. | ..... | ..... | ..... | ..... | ..... | ..... | 1.42 | ..... | ..... | 2.11 | ..... | 2.75 | 3.58 | 4.62 | 6.14 | 6.96 | 7.78 |

(a) 24-in. lengths. (b) Reinforced (c) Delivered on job: 5% discount, 10th of month. †21-in. diameter. ‡Price per 2-ft. length.

## Oregon Portland Denied Special Basis Contract

COMPTROLLER GENERAL McCarl recently ruled against the Oregon Portland Cement Co. which offered to furnish the bureau of reclamation of the department of the interior with 500,000 bbl. of cement over a 3½-year period under a contract provisional on Congress passing appropriations to cover the amount involved after the present fiscal year's appropriations had run out.

McCarl held that such a contract was not legal. The cement was to be used in the Owyhee dam project in eastern Oregon.

Until recently it had been the practice of the bureau of reclamation, department of the interior, to make contracts regardless of fiscal year periods after congress had authorized the construction of a given project and had appropriated funds to begin work.

In making such contracts the bureau of reclamation has used a stipulation, incorporated in the contract, to the effect that in case the necessary appropriation to carry out the contract is not made, the contractor releases the United States from all liability.

The comptroller general recently has noted an exception to this procedure in the case of supply contracts and the cement job under consideration being of this general classification, the matter was submitted to him for advance decision as to whether award might be made on the 500,000 bbl. basis, over a period of 3½ years, or whether it will be necessary to limit the present acceptance to the amount of cement estimated as being required for the fiscal year 1930.

The comptroller general rendered a decision to the effect that the award must be limited to the needs for the fiscal year 1930, unless the appropriation available for that year is adequate for the purchase of the entire quantity required to complete the project.

Under the ruling it is not feasible to contract for cement beyond the current fiscal year. The secretary therefore authorized an award of the contract for 75,000 bbl. of cement to the Oregon Portland Cement Co. —*Portland* (Ore.) *Journal.*

## Lehigh Portland Offers Prizes for Modern Airport Design

THE LEHIGH Portland Cement Co. has inaugurated a national competition, open to architects, engineers and city planners, for the design of airports which will help American communities to solve their landing field problems. Twenty-four of the country's outstanding architects, engineers, city planners and aeronautic experts have consented to serve on the program committee of the Lehigh airports competition.

Twelve thousand professional men have received copies of the competition specifications, which were prepared by the program committee, and more than 1000 inquiries have been received by C. S. Taylor, manager of the airports competition. The prize awards total $10,000, and the competition closes November 18.

## Phosphate Producers Urge Ban on Convict-Mined Rock

ON behalf of domestic phosphate producers, L. R. Mason of New York appeared before the senate finance committee recently to urge tighter restrictions against imports of rock mined by convict labor in Morocco. The present law bans goods manufactured by convicts, but does not apply to commodities grown or mined. Mr. Mason wants Section 307 broadened to cover the basic industries of mining and agriculture. Inasmuch as imports of phosphate are minute as compared to exports, there was some comment on the part of committee members against the proposal.—*Engineering and Mining Journal.*

## Cut Stone Quarries Merge

COMPLETION of the sale of the Indiana Oolitic Stone Co. to the Bloomington Limestone Co., the second largest stone corporation in the Bloomington, Ind., district, was announced recently in the *Indianapolis* (Ind.) *News.*

The price paid by the new owners for the Oolitic company was said to be $1,000,000, of which amount $100,000 was paid in cash and $900,000 in preferred stock. The deal has been pending for six months. With the Indiana Oolitic Co. goes some valuable stone land yet undeveloped, it was said.

The quarries acquired by the Bloomington Limestone Co. are said to produce some of the best buff stone of the Indiana belt.

## Heavy Shipments of Sand and Gravel on the Ohio River

SAND AND GRAVEL shipments on the Ohio river totaled 8,749,233 tons in 1928 or 41.8% of the total tonnage of all materials shipped on the river, according to figures compiled by the U. S. Army division engineer at Cincinnati. Over 400,000 tons of crushed stone or about 2% of the grand total moved on the river, and this combined with the figures for sand and gravel, shows the rock products materials to constitute almost 44% of all Ohio river shipments. Coal shipments comprised 43.8% of the total and iron and steel but 6.75%.—*Davenport* (Iowa) *Times.*

## Retail Prices of Various Rock Products Materials

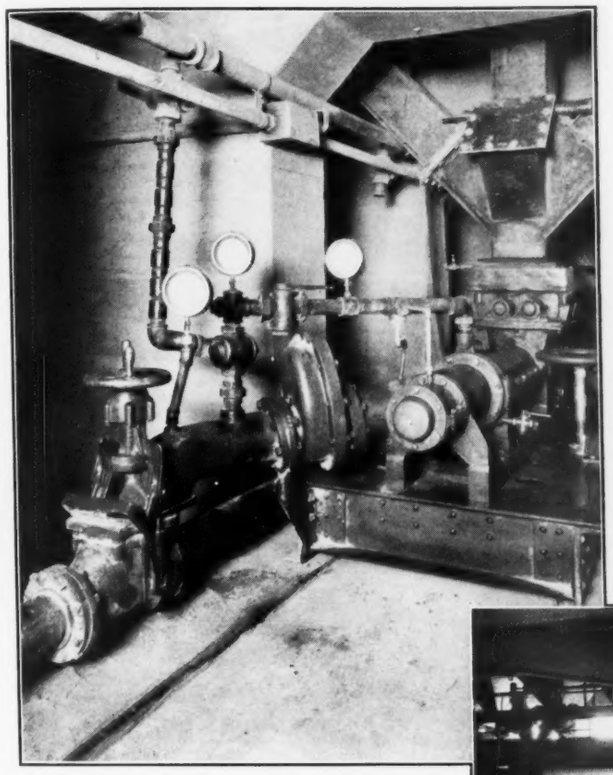
THE TABLE below gives average prices paid July 1, 1929, by contractors for various rock products, delivered on the job at different principal cities of the United States. These prices were secured through the Bureau of Census.

AVERAGE RETAIL PRICES FOR ROCK PRODUCTS MATERIALS, JULY 1, 1929

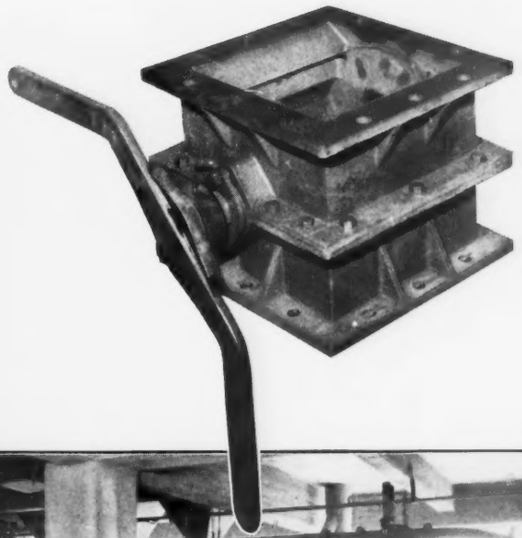
| City | MATERIAL | | | | | |
|---|---|---|---|---|---|---|
| | Portland cement, per bbl. excl. of cont. | Gypsum wallboard, ⅜-in., per M | Hydrated lime, per ton | Building sand, per cu. yd. | Crushed stone, ¾-in., per ton | Gypsum plaster, neat, per ton |
| New Haven, Conn. | $3.10 | ..... | $21.50 | $1.50 | $2.25 | ..... |
| Waterbury, Conn. | 3.00 | $30.00 | 20.00 | 1.35 | 2.45 | $18.00 |
| New London, Conn. | 3.00 | 25.00 | 26.00 | 1.50 | 2.40 | 18.00 |
| New Bedford, Mass. | 3.00 | 25.00 | 19.00 | 1.75 | 3.00 | 14.50 |
| Haverhill, Mass. | 2.80 | 27.50 | 20.00 | 1.50 | ..... | 15.00 |
| Poughkeepsie, N. Y. | 2.28 | 22.00 | 24.00 | 2.50 | 3.50 | 18.00 |
| Albany, N. Y. | 2.97 | 24.75 | 18.00 | ..... | ..... | 13.50 |
| Syracuse, N. Y. | 3.15 | 22.50 | 24.00 | 2.35 | 1.80 | 18.00 |
| Rochester, N. Y. | 2.85 | 20.00 | 20.00 | 2.50 | 2.40 | 13.00 |
| Buffalo, N. Y. | 3.10 | 25.00 | 18.00 | 2.50 | 2.05 | 14.00 |
| Paterson, N. J. | 2.60 | 23.00 | 20.00 | 1.75 | 2.08 | 16.00 |
| Trenton, N. J. | 2.40 | 26.00 | 18.00 | 2.03 | 2.10 | 17.50 |
| Scranton, Penn. | 2.80 | 30.00 | 18.00 | 3.25 | ..... | 17.00 |
| Philadelphia, Penn. | 2.35 | ..... | 15.50 | 1.85 | 2.45 | 19.75 |
| Harrisburg, Penn. | 2.55 | ..... | 19.00 | 4.20 | 1.60 | 20.50 |
| Baltimore, Md. | 2.65 | 32.50 | 13.00 | 2.00 | 2.75 | 13.50 |
| Washington, D. C. | 2.55 | 22.50 | 14.00 | ..... | ..... | 14.50 |
| Richmond, Va. | 3.10 | 31.00 | 17.50 | 1.95 | 2.45 | 20.00 |
| Fairmount, W. Va. | 2.90 | 35.00 | 17.00 | 3.40 | 3.50 | 18.00 |
| Winston-Salem, N. C. | 2.80 | 32.50 | 14.00 | 2.50 | 4.50 | 15.00 |
| Columbia, S. C. | 2.70 | ..... | 19.00 | 1.75 | 2.75 | 17.00 |
| Shreveport, La. | 3.20 | ..... | 22.50 | 2.00 | 4.75 | 24.00 |
| Tampa, Fla. | 2.40 | ..... | 20.00 | 2.00 | 4.00 | 19.00 |
| Birmingham, Ala. | 2.60 | ..... | 20.00 | 3.50 | ..... | 16.00 |
| Erie, Penn. | 2.80 | 25.00 | 22.00 | 2.25 | ..... | 19.00 |
| Canton, Ohio | 2.50 | 33.00 | 16.00 | 2.50 | 3.50 | 15.00 |

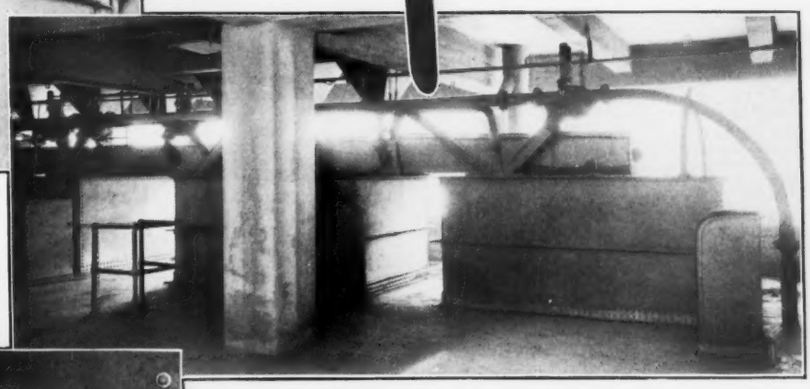
| City | MATERIAL | | | | | |
|---|---|---|---|---|---|---|
| | Portland cement, per bbl. excl. of cont. | Gypsum wallboard, ⅜-in., per M | Hydrated lime, per ton | Building sand, per cu. yd. | Crushed stone, ¾-in., per ton | Gypsum plaster, neat, per ton |
| Akron, Ohio | $3.00 | $35.00 | $17.00 | $2.00 | $3.00 | $15.00 |
| Toledo, Ohio | ..... | 22.50 | 20.00 | 3.04 | 2.75 | 16.00 |
| Columbus, Ohio | 2.75 | 23.00 | 17.50 | 2.25 | 2.50 | 15.00 |
| Cleveland, Ohio | 2.68 | 22.00 | 16.00 | 4.73 | 3.75 | 11.00 |
| Youngstown, Ohio | 2.80 | ..... | 18.00 | 2.75 | 2.75 | 15.00 |
| Detroit, Mich. | 2.60 | 24.00 | 14.80 | 2.75 | 3.00 | 18.00 |
| Saginaw, Mich. | 2.80 | 25.00 | 20.00 | 2.80 | 3.00 | 20.00 |
| Terre Haute, Ind. | 2.90 | 28.00 | 18.00 | 1.65 | 3.50 | 17.00 |
| Rockford, Ill. | 2.90 | ..... | 16.25 | 1.75 | 2.40 | 16.00 |
| Chicago, Ill. | 2.00 | ..... | 18.00 | 1.80 | 1.60 | 11.50 |
| Milwaukee, Wis. | 2.40 | 25.00 | ..... | 1.90 | 1.55 | 18.00 |
| Lansing, Mich. | 2.85 | ..... | 22.00 | 2.25 | 2.25 | 16.50 |
| Des Moines, Iowa | 2.66 | 23.75 | 20.00 | 1.60 | 3.60 | 10.00 |
| St. Louis, Mo. | 2.45 | ..... | 18.00 | 2.70 | 1.90 | 13.00 |
| Kansas City, Mo. | 2.40 | 25.00 | 24.00 | 1.70 | 1.88 | ..... |
| St. Paul, Minn. | 2.60 | 25.00 | 21.00 | 1.40 | 2.00 | 16.00 |
| Sioux Falls, S. Dak. | 3.10 | 27.00 | 26.00 | 1.50 | 2.25 | 16.00 |
| Grand Forks, N. D. | 2.80 | 25.00 | ..... | 2.60 | ..... | 16.00 |
| San Antonio, Tex. | 2.82 | 36.00 | 20.00 | 2.10 | 2.35 | 15.50 |
| Tucson, Ariz. | 3.61 | ..... | 30.00 | 1.50 | 2.50 | 18.00 |
| Los Angeles, Calif. | 2.64 | 34.00 | 24.00 | 2.30 | 2.05 | 10.00 |
| Long Beach, Calif. | 2.48 | 32.50 | 25.00 | 2.16 | 2.50 | 15.00 |
| San Francisco, Calif. | 2.41 | 31.75 | 21.00 | 1.40 | 1.25 | ..... |
| Seattle, Wash. | 2.65 | 32.50 | 22.00 | 1.65 | ..... | 20.00 |
| Portland, Ore. | 2.60 | 27.50 | 25.00 | 2.00 | 1.60 | 19.00 |

# Portable Fuller Kinyon Pumps Speed Shipment of Cement in Bags and Bulk



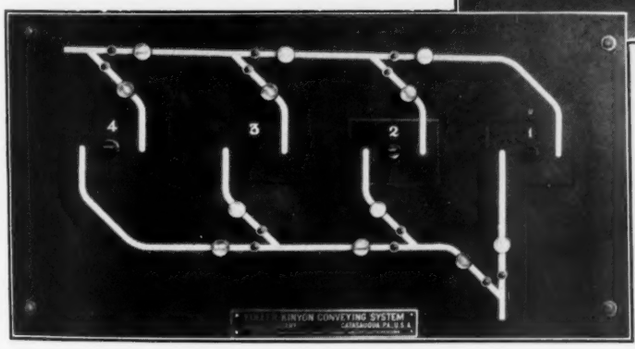
(Above) Eight-inch Portable Pump.





(Above) Fuller 14-inch rotary valve for silo discharge spouts, etc. This valve moves freely.

(Below) Control panel for two portable pumping systems, each delivering to four packer bins.




(Left) Parallel pipe lines of two systems delivering cement from silos to four packer bins. These systems operate by automatic and remote control from the panel shown on the left.

**Fuller-Kinyon Portable Pumping Systems are furnished complete and ready for erection, including silo discharge spouts, rotary spout valves, transport line and valves, bin connections and complete automatic and remote control panels for operating the transport line valves of one or more systems.**

FULLER-KINYON CONVEYING SYSTEM

**Fuller Company**

CATASAUQUA, PENN. U. S. A.

*When writing advertisers, please mention ROCK PRODUCTS*

# News of All the Industry

## Incorporations

**Oatsman Sand and Gravel Co.**, Flint, Mich., $50,000.

**Fall Creek Gravel Co.**, Indianapolis, Indiana, established at 56th Street and Fall Creek.

**J. P. Gilman Granite Co.**, Kansas City, Mo., $50,000.

**United Concrete Products Co.**, Wichita, Kans., $30,000.

**Travertine Rock Co.**, St. Petersburg, Fla. J. G. Dee, 411 Villagrande St., St. Petersburg.

**Wabash Portland Cement Co.**, Stroh, Ind., filed papers increasing capital stock from 30,000 shares at $50 per share to 400,000 shares, no par value.

**Colorado County Gravel Co., Inc.**, Columbus, Tex., $100,000. J. H. Harbert, S. Hamburger, and J. C. Burt.

**Crow Creek Gravel Co.**, Forrest City, Ark., corporate name changed to Crow Creek Gravel and Sand Co.

**Duntile Products Co., Inc.**, Del Rio, Tex., $25,000. To manufacture concrete products. W. H. Ritchey, F. L. Howard and Harry Iredale.

**Asheville Concrete Products Co.**, Asheville, N. C., $100,000. Mark Reid, Jr., Reed Kitchin and Jay McGahey.

**Greater St. Louis Quarry and Construction Co.**, Valley Park, Mo. Sam J. Pryant, Webster Groves, Mo., and Bernard J. Brown, Valley Park.

**Willard Concrete Products Corp.**, Norwalk, Conn., $20,000. R. L. Cookingham, 2418 Kenmore Pl., Brooklyn, N. Y., and others.

**Buff and Blue Oolitic Stone Co.**, Bloomington, Ind., corporate name changed to Victor Buff Stone Co.

**Duntile, Inc.**, Detroit, Mich., $100,000. To deal in building materials. Frank L. Mettler, Wilmington, Del.

**Brevoort Gravel Co.**, Illinois corporation, incorporated in Indiana; 186 shares. To produce and sell stone, cement, sand and gravel, etc. Indiana agent, W. H. Hill, Vincennes, Ind.

**Lexington Concrete Products Co.**, Lexington, Ky., $25,000. T. Ward Hanley and Bruce Isaacs of Lexington, E. W. Ripy, Lawrenceburg, Ky., and Silas Wilson, Frankfort, Ky.

**Central Sand and Gravel Co., Inc.**, Noblesville, Ind., 1,000 shares, no par value. Sterling R. Standerford, Robert M. House, Floyd G. Christian and Glen J. Gifford.

**Willard Cement Block Co.**, Quincy, Mass.. 150 shares common. Thomas A. Bersani, president; Loretto Bersani, treasurer, 350 Granite St., Quincy, and John Bersani.

**Pacific Coal Co., Inc.**, New Bedford, Mass., $100,000. To deal in cement, lime, stone, etc. Abraham Kaplan, Rubin Forman and Samuel Abrams.

**Andrew-Wotton Tile Co.**, Bridgeport, Conn., $25,000, (500 shares, $50 each). To manufacture and sell tile, marble and slate products. Robert G. Wotton, Albert W. Andrews and Edward Murphy.

**Superior Sand and Gravel Co., Inc.**, De Kalb, Ill., 500 shares, no par value. To produce and deal in sand, gravel and building materials. T. E. Courtney, John C. Killan, P. W. Fisk and H. D. Fisk, First National Bank Bldg., De Kalb.

## Quarries

**Chemical Lime Co.**, Bellefonte, Penn., has installed equipment at its plant in Buffalo Run valley for washing stone. Water from the nearby stream will be used for washing.

**Cleveland Quarries Co.**, Cleveland, Ohio, shut its entire plant down on Wednesday, August 7, to give its employes an opportunity to join in with the Amherst Community picnic at Crystal Gardens.

**Quincy, Ill.** The quarry committee of the city council now has under consideration whether to lease or operate the city quarry. Several meetings have been held, but no definite decision has been reached as yet.

**Ohio Lime and Stone Co.**, Pemberville, Ohio, recently held a stockholders' meeting to consider a proposition for the disposal of the company's plant located on the Ohio Central railroad, south of Luckey, Ohio.

**Kittanning Limestone Co.**, Kittanning, Penn., has called a stockholders' meeting to consider increasing the capital stock of the company and changing the corporate name to Kittanning Cement and Limestone Co.

**Owen Sound Quarries, Ltd.**, Owen Sound, Ontario, Can., recently acquired the quarry formerly operated by the Oliver Rogers Co., Ltd., situated in the eastern section of the city. Dr. R. Howey is president of the company, and W. J. Christie, secretary-treasurer.

**Cleveland Quarries Co.**, Cleveland, Ohio, has leased 11,000 square feet of office space in the new Builders Exchange Building of that city. The company, which is a new corporation formed recently with the consolidation of the Cleveland Stone Co., and the Ohio Cut Stone Co., expects to occupy its new offices about Nov. 1.

**Greater St. Louis Quarry and Construction Co.**, Valley Park, Mo., has taken over a 55-acre quarry tract south of Clayton road in St. Louis county, formerly operated by Otto Orth and Son. Bernard J. Brown, of Valley Park, is general manager, and the company will produce agricultural limestone, crushed commercial stone, etc.

**Glasgow Junction, Ky.** A permanent rock quarry, operated by convict labor, will be opened by the state highway department on the Louisville and Nashville railroad, two and a half miles north of Glasgow Junction. The Kentucky-Tennessee Light and Power Co. is extending a line from Glasgow Junction to the quarry to furnish power for the machinery.

**Miami Township, Mo.** The government has leased the stone quarry on the George Suess estate here for a period of ten years, and will use the rock quarried for improvements along the banks of the Missouri river. The War department has been quarrying stone at the Huddleston quarry for the past two years or more, but there is a prospect that their lease on that quarry will be abandoned for the reason that the dip of the stone away from the face necessitates additional stripping operations.

## Sand and Gravel

Fort **Worth Sand and Gravel Co.**, Fort Worth, Tex., will double the capacity of its plant by a new addition soon to be completed.

**Monessen Sand and Gravel Co.**, Monessen, Penn., has been merged with the Rogers Sand Co., of Pittsburgh, Penn.

**Norwalk, Ohio.** County commissioners have opened a gravel pit on the Ridge Road, ten miles south of Norwalk, and will use the material for the improvement of dirt roads.

**Edgerton, Minn.** Milwaukee Railroad will open its big gravel pit near here shortly. The pit has been the property of the railroad for a good many years, but has never been operated, although preparations for that purpose were begun before the World War and later abandoned.

**Indiana.** County commissioners awarded contract for furnishing gravel for roads in Center and Perry townships to Claude R. Hines at 69c per cu. yd. The gravel for Center township will be taken from the W. W. Wilson farm, and for Perry township from the O. O. Lindsay farm.

**Victor Sand and Gravel Co.**, Shreveport, La., which operates a plant at Lang's Camp, 8 miles north of Ashdown, Ark., will build a railroad spur from Wilton, Ark. to its plant. Southwestern Gas and Electric Co., Shreveport, La., will construct a high-tension line from Wilton to the river and furnish power.

**Wilcox Sand and Gravel Co.**, Grants Pass, Ore., recently incorporated, has already begun to operate its new plant, erected at a reported cost of $50,000. The company is excavating gravel from the Rogue river. The first contract is for 1000 cu. yds. of gravel, which the Southern Pacific railroad plans to use in construction of reinforcing and improving tunnels in the Siskiyou mountains.

## Lime

**Fischer Lime and Cement Co.**, Memphis, Tenn., has donated the sand for the playground of the Shelby County Tuberculosis Society's summer health camp at Cheerfield Farm.

**J. T. Bulmer**, Dallas, Texas, has acquired a site north of Fluvanna, Tex., and will establish a large lime plant.

## Agricultural Limestone

**Williams County, Ohio.** From present indications there will be about fifty carloads of agricultural limestone distributed among farmers of this county when the special train arrives with this material on August 22. It is reported that twenty-five carloads have already been ordered.

## Cement

**Southwestern Portland Cement Co.**, El Paso, Tex., is now using natural gas for cement manufacture. The gas is furnished by the Texas Cities Gas Co.

**Consolidated Cement Corp.**, Chicago, Ill., has resumed operations at its Fredonia plant after a shutdown of several weeks due to slackened marketing conditions caused by unseasonable weather.

## Cement Products

**L. M. Diether Co.**, Granville Island, Vancouver, B. C., is planning to erect a ready-mixed concrete plant to cost $36,500. The plant has been designed by D. M. Mathieson.

**Pontiac Redi-Mixed Corp.**, Pontiac, Mich., recently formed by W. R. Ransom, T. S. McGaughan and associates, is planning construction of a new ready-mixed concrete plant, to cost $35,000 with machinery.

## Miscellaneous Rock Products

**North American Paving Co.**, St. Louis, Mo., has purchased the properties of the St. Louis Brick Asphalt Co., at Ardmore, Okla., and already has a crew of men at work in the mine northwest of that city. The company has also acquired 100 additional acres of rock asphalt land adjoining the mine, and has signed a lease on 300 additional acres. An Ardmore office will be opened soon, and a plant established to prepare the rock asphalt for shipment.

## Personals

**Carl Ingwersen**, superintendent of the United States Gypsum Co.'s block plant at Gypsum, Ohio, has been transferred to Chicago.

**J. G. Bragg**, formerly Service Engineer of the Alpha Portland Cement Co., Easton, Penn, has been appointed Eastern Sales Manager of the company.

**Curtice Yingling**, Port Clinton, Ohio, employed by the United States Gypsum Co. for a number of years, has been promoted to a higher position at the company's plant at Indiana Harbor, Ind.

**Roswell Heth**, chief clerk of the Atlas Portland Cement Co.'s Hudson, N. Y. plant is now at Waco, Texas, arranging an office system for the company's new plant there.

**P. H. Ballard** has been assigned the entire state of West Virginia in the sales organization of the Wellston Iron Furnace Company's cement department, and J. C. Baxter, who previously covered that territory, will have the central Ohio field.

**Ross Cox**, Fort Dodge, Ia., for eight years assistant deputy in the County Treasurer's office, has resigned and accepted a position with the Universal Gypsum and Lime Company at Fort Dodge, Ia.

**R. H. Bacon**, for the past several years in charge of publicity for Fairbanks, Morse & Co., Chicago, has also taken over the direction of advertising. **Thomas W. Hall** has also joined the Fairbanks organization and will be engaged in editorial work.

**George E. Pierson**, formerly manager and sales manager of the Lone Star Cement Company Indiana, Inc., has been elected vice-president of that company. Mr. Pierson will relinquish his duties as sales manager, but will continue as manager of the company.